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ABSTRACT

The findings of this study were obtained by locating, in the post-preschool setting, 116 preschool graduates previously diagnosed as handicapped. Their past ability status, present ability and achievement status, and current demographic status were documented. These data were analyzed to determine the extent to which the benefits of the preschool experience were maintained following preschool and the variables which were most beneficial to maintaining these benefits. The following three criteria were used to determine if these benefits were maintained: class placement (regular vs. special education); gain scores (cognitive and receptive language); and achievement performance in relation to a contrast group of Ss with no preschool background. The results suggest that benefits of the preschool experience were maintained as evidenced by the following data: 34% of the graduates are now keeping pace with peers in regular education program; cognitive growth gains achieved during preschool were maintained in the post-preschool setting; in all achievement areas, when compared to a contrast group, pretest scores were significantly higher and most, though not all, posttest scores were significantly higher; and variables which most influenced the maintenance of benefits were diagnosed handicapped condition and rate of cognitive gain while in preschool. (Author/BD)

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FINAL REPORT
R.F.P. NO. 76–91

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Effectiveness of Early Education for Handicapped Children

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Dr. Karen J. Morris
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University of Washington
Experimental Education Unit
Child Development and Mental Retardation Center

September, 1977

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
U.S. Office of Education
Bureau of Education for the Handicapped

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October 30, 1977

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U.S. DEPARTMENT
HEALTH, EDUCATION, AND WELFARE
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Abstract

The findings of this study were obtained by locating, in the post-preschool setting, 116 preschool graduates previously diagnosed as handicapped. Their past ability status; present ability and achievement status; and current demographic status was documented. These data were analyzed to determine the extent to which the benefits of the preschool experience were maintained following preschool; and the variables which were most beneficial to maintaining these benefits. Three criteria were used to determine if these benefits were maintained. They were: class placement (regular vs. special education); gain scores (cognitive and receptive language) and achievement performance in relation to a contrast group of subjects with no preschool background. The results suggest that benefits of the preschool experience were maintained as evidenced by data indicating that: (a) thirty-four percent of the graduates are now keeping pace with peers in regular education programs; (b) cognitive growth gains achieved during preschool were maintained in the post-preschool setting; (c) in all achievement areas, when compared to a contrast group, pre-test scores were significantly higher; most, though not all, post-test scores were significantly higher; gains, however, were not significantly different. Variables which most influenced the maintenance of benefits were diagnosed handicapped condition and rate of cognitive gain while in preschool.

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CHAPTER 1

RESEARCH ON EARLY INTERVENTION: HISTORY, CURRENT STATUS, AND LIMITATIONS

Introduction

Preschool education for both handicapped and nonhandicapped children is not a new phenomenon, although it was not until the 1968 Handicapped Children's Early Education Assistance Act that the Federal government began making a concerted effort to provide handicapped young children with educational opportunities. Since then, interest and investment in early intervention with preschool handicapped children has shown marked growth with increases in numbers of children served, greater dollar amounts being allocated to intervention programs, and increased focus on the very young and the severely handicapped.

This recent interest in early intervention stems from a number of factors. Parental concerns have led to increased demands that adequate and early educational services be provided to their handicapped children. Recent litigation has established the rights of handicapped children to the same kinds of educational opportunities as those afforded other children. Public Law 94-142 provides for education for all handicapped children aged 5-18 and provides incentive funds for services to children aged 3-5. Head Start programs have been directed to insure that at least 10% of their enrollment opportunities be utilized for handicapped children. Furthermore, the rising cost of adult care facilities for handicapped people reinforces the issue of the potential long-term financial benefits of early intervention. Hayden and McGuiness (1977) provide a comprehensive summary of current bases for early intervention.

Along with greater emphasis on providing educational opportunities for younger children has come the need to demonstrate the effects of federal, state, and local funding for preschool programs for the handicapped. Recent legislation and legal decisions on the rights of handicapped persons have stimulated evaluation studies in the area of the benefits of early education.

In our own state of Washington--with limited and inadequate funding for regular education, special levy failures in many school districts, and a request for increased funding of the Washington State Handicapped Fund for the coming biennium--it is reasonable to expect that the Legislature will seek to establish a sounder basis for funding educational programs of all types in this state and will surely need and request evidence of the effectiveness of early education for the handicapped.

In 1969, the Model Preschool Center for Handicapped Children (with training, research, and service components) became one of the first 24 HCEEP projects funded by the Bureau of Education for the Handicapped. Since this time, the preschool has provided educational services for over 550 handicapped children.

While the staff of the Model Preschool Center have consistently advocated long-term studies of children who have received early education, funding limitations have not permitted the development of a systematic study of the effects of early education on later school performance. The research presented here, designed and funded in response to RFP no. 76-11, is an attempt to investigate and measure the effects of early intervention programs at the Model Preschool Center for Handicapped Children by assessing the current status of Model Preschool graduates.

Research on Effectiveness of Early Intervention

Early intervention for children identified as handicapped or at risk is intended to prevent, remediate, or reduce the potential impact of some handicapping condition on a child and his family. Of major interest to proponents of early intervention are theoretical bases for intervention as well as empirical data demonstrating that intervention has indeed been effective. Particular evaluation concerns include the nature and degree of program impact, the extent to which impact endures over time, specific program components contributing to this impact, and individual child characteristics which serve to facilitate impacts.

The early years (1950-1968). The years prior to 1968 involved diverse efforts to establish a logical and empirical basis for early intervention. Hunt (1961; 1966) summarized data regarding the effects of experience on intelligence. In an eloquent challenge to the concepts of fixed and predetermined ability, Hunt concluded that "cultural deprivation may be seen as a failure to provide an opportunity for infants and young children to have the experiences required for adequate development..." (1966, p. 53). He went on to suggest that the kinds of encounters a child experiences during the early years may significantly affect his intellectual development.

Empirical support for early intervention came from data reported by Kirk (1965) and Skeels (1966). Kirk (1965) reported a series of studies in which young mentally retarded children were provided with a preschool educational program. His conclusion was that intervention served to reverse the depressed growth pattern seen in children who received no intervention. Skeels (1966), in a well-known study, conducted a 21-year follow-up of children differentially placed in an orphanage (little adult attention) or a state institution for the mentally retarded (a great deal of attention from the staff and the older girls on the ward). Children placed in the more stimulating environment demonstrated dramatic long-term differences in independent living skills and educational attainment.

Other related data suggesting a need for early intervention included:

a. the critical periods concept, which postulated the existence of time intervals during which specific stimulation could be maximally effective in influencing the acquisition of certain responses (Caldwell, 1962; Dennenberg, 1964);

made in Head Start washed out by the end of second grade in most cases. Jerome Kagan (1976) presented data which suggested that the harmful effects of early deprivation can be reversed later on. He argued against the "doctrine of irreversibility" by pointing to studies both in this country and abroad which show that even severe deprivation during the first one, two, or even three years of life can be remediated either by later educational and cultural opportunities or even by age.

Reactions. Thus, as of 1975, the status of early intervention was at least somewhat questionable. While supporters of the movement continued to advocate early intervention, could give a good rationale for such, and could point to significant short-term gains as a result of preschool programs, they were hard pressed to demonstrate that intervention resulted in enduring significant gains.

Unfortunately, most longitudinal studies can be criticized for taking an oversimplified approach to impact research (Beller, 1973). Major criticisms include practices such as the use of inappropriate instruments in the evaluation of cognitive changes, narrow conceptions of important outcome variables to be measured, ignoring what happens to children after they leave early intervention programs, and making statements about "longitudinal" impact after only 2-5 years of follow-up. Indeed, Miller and Dyer (1975) have demonstrated that the outcome of early intervention is significantly affected by the type of program a child enters after early intervention, and that more continuity and more enduring gains may be seen in areas other than academic skills.

Recent data. Since 1975, longitudinal data from several sources have been presented to indicate that early and continuous intervention is indeed effective. Hayden and Haring (1976) report preliminary data showing that school-aged children with Down's syndrome who received special education as young children or infants perform better than Down's syndrome children who received no early intervention. Furthermore, children who experienced early education have so far maintained developmental gains. Schweinhart and Weikart (1977), in an eighth grade follow-up of graduates of High/Scope's Ypsilanti Perry Preschool Project, found that while no significant differences existed between control and experimental groups in IQ scores, there was an increasingly greater difference in achievement test scores, reaching a difference of more than one year by eigth grade. Additionally, while 38% of children without preschool had received special education placement by grade 4, only 17% of children with preschool experience were so placed.

Palmer (1977) reports data on subjects who received preschool training in 1964. Mean IQ was significantly higher than that of controls; the average child in the experimental groups was more than six months advanced over the controls in arithmetic achievement. Of the controls, 45% were one or more years behind in grade level as compared to only 22% of the experimental children. Lazar, Hubbell, Murray, Rosche, and Royce (1977) summarized a number of recent studies reporting that gains originally thought to have washed out by second grade had reappeared by fifth grade. In addition, they reported that of five completed studies with data on special education, four show between 50%

and 90% fewer special education placements among the children with preschool education.

As Weikart (1977) suggests, these data are "almost a vindication for those whose hopes for the efficacy of preschool intervention were dashed by the short-term evaluations of the 1960's" (p. 9). It appears that use of truly longitudinal data as well as selection of appropriate outcome variables (such as school placement) will brighten the picture for preschool intervention. It is apparent, however, that a number of questions remain to be answered including the optimal age for intervention, matching child characteristics with program characteristics, the extent to which parents should be involved, teacher behaviors of importance, and the selection of appropriate and worthwhile outcome variables. In addition, a number of authors have suggested a pressing need for studies validating the effectiveness of early intervention with more severely handicapped and high risk children (see, for example, Cornell and Gottfried, 1976; Meir, 1975; and Sailor and Haring, 1977). The research presented here is an attempt to assess the current status of a sample of handicapped children who received intervention at an early age. The following section addresses the problems and limitations encountered in such an attempt.

Research Problems and Limitations

The need to ascertain the actual influence of preschool programs is exceeded only by the difficulties of setting up a research program which will adequately address the question. The nature of the target population and the situation in which the research must be conducted virtually obviate the appropriate utilization of standard research strategies. Before presenting the strategies which were finally selected for the research, and interpreting the data which follows, it will be helpful to review a few of the problems encountered.

Contrast group. Traditionally, when the impact of some particular variable must be determined, one would simply create two comparible groups of subjects, expose one of the groups to the variable in question while withholding the variable from the other group, and then measure the impact of the variables in terms of the differences which existed between the two groups at the end of the study. Obviously, however, there are ethical problems in systematically denying preschool experiences to one group of handicapped children while providing them for another, comparable group. There was, therefore, no preselected contrast groups available for this study. It was, however, possible to locate a contrast group of handicapped children with no preschool experience and compare their performance with the performance of Model Preschool graduates.

It is difficult to determine why this group did not attend preschool. The contrast group was located within the same area as many of the subjects referred to the Model Preschool. It is possible that attitudes of the parents, advice of original diagnosticians, financial resources, and the mildness of the handicap may have precluded attendance by some. Most contrast subjects began school in regular education and

were later transferred to special education, indicating that they were undiagnosed at school entrance. Because the past performance of this contrast group has not been documented in any school setting, it is impossible to determine what, if any, preschool differences exist between these two groups or to determine the impact of these differences on school performance. Although the comparison of these two groups provides some information, the lack of control over a multitude of variables which may have influenced those differences makes interpretation difficult.

Sample size. The nature of the study required examining past as well as current child records to determine those variables which may have influenced a child's progress. Children were assessed in the past on a variety of tests; some were not formally assessed at all. Consequently, sub-groups of subjects who were measured on acceptable instruments were often small. In many cases only a descriptive analysis could be made of these sub-groups. In other cases the size of the sub-groups under comparison was too divergent for standard statistical analysis. Whenever practical, statistical significance was tested, but evaluating the educational significance of the data often proved more fruitful.

Because of the varying and sometimes small sample size, generalizations must be made with caution. Many times, however, results from the analyses of these sub-groups provided hypotheses for future inquiry.

Measuring instruments. When gathering information on cognitive ability, language ability, and academic achievement, every attempt was made to use the best information available. Only results from professionally recognized and well-standardized instruments were used, even though this meant the loss of subjects for evaluation. The interpretation of mean scores resulting from these measurements should be done cautiously, recognizing that these are measures of general ability acquired on children who often have very specific disabilities. These instruments do provide relative information on general functioning, and, to date, they are the best we have to provide a general understanding of a child's overall ability level.

A greater problem arose as the result of changes in measurement instruments as the child progressed from the preschool to the post-preschool setting; instruments employed with the preschool child were quite different from those employed with the school-age child. Although all these instruments attempt to estimate the degree to which a child approximates "normal" developmental level, they emphasize different areas of development, therefore, they were only roughly comparable. Consequently, it was possible to trace development from preschool though the school years with only a small portion of the sample.

Purpose and Objectives

In light of the limitations and methodological difficulties inherent in this type of investigation, it was the purpose of this research to accomplish the following objectives:

1.0 To identify and locate those graduates of the Model Preschool who are presently attending school programs in the Seattle-King County area, and to investigate those children for the purposes of:

1.1 Ascertaining their present educational status in terms of placement, and, where possible, level of performance and their rate of progress.

1.2 Ascertain, where possible, the degree to which their present educational status represents maintenance of or change in their relative performance during enrollment in the Model Preschool Center Program or at the time of their transfer.

1.3 Ascertain, where possible, which individual child, family, social economic, preschool program or school program variables appear to be related to any observed maintenance of or change in educational status.

2.0 To identify and locate a number of handicapped children who did not attend any preschool, but who are of similar ages, are diagnosed as having handicapping conditions, and who attended the same general post-preschool programs as the Model Preschool graduates; and to investigate those children for the purposes of:

2.1 Ascertaining their present educational status in terms of level of performance, and, where possible, their rate of progress; and identifying the extent to which their status differs from that of the Model Preschool Center graduates.

The first set of objectives (1.0, 1.1, 1.2, 1.3) relates directly to Model preschool graduates. With this group it was possible to document the extent and nature of their preschool experience. Also because of previously established contacts with the families of those children, information concerning family characteristics and background was obtainable. Finally, because the Model Preschool Program employs extensive data collection and analysis systems, it was possible to determine for some graduates whether their initial level of preschool performance was or was not maintained during later school programs. Investigation of this group allowed the research to provide at least partial answers to the following two questions:

- To what extent are the benefits of a preschool program maintained one or more years following the preschool experience?

- What post-preschool settings and/or features of those settings are most beneficial in maintaining or increasing the preschool benefits?

The second set of objectives (2.0, 2.1) relates to the investigation of children who did not attend any preschool, and compares their status with those of children who did attend the Model Preschool Center. The present educational and performance status of this contrast group was documented. This status was then compared to the documented status of the Model Preschool graduates.

CHAPTER 2

METHOD

Subjects

Selecting the Target Population

Two groups of subjects were the targets of the investigation: handicapped children of school age who attended programs in the Model Preschool Center at the University of Washington for at least six months during the years 1969 through 1976, and handicapped children of school age who did not attend any preschool program at any time. For purposes of this investigation, "handicapped children" will be defined as specified by the Bureau of Education for the Handicapped:

> "Mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, crippled, or other health impaired who by reason thereof require special education and related services, the term includes children with specific learning disabilities to the extent that such children are health impaired, children who by reason thereof require special education and related services (attachment "C," RFP 76-91, p. 4)."

Model Preschool Center graduates. Graduates of the Model Preschool Center represented a particularly attractive subject group: much of the case history data required for the subjects was already available; accurate records of developmental progress during the preschool years existed; rapport had already been established with parents and guardians; and most of the subjects were presently placed within a reasonably short distance of the University of Washington.

A review of Model Preschool records indicates that more than 550 individual children attended Model Preschool programs during the years 1969 through 1976. Not all of those children were deemed suitable for the investigation, however. Children were eliminated from further consideration if they were:

1. Down's syndrome children. Another investigation, A Study of the Acceleration and Maintenance of Developmental Gains in School-age Down's Syndrome Children, was presently in the second of a three-year follow-up of Down's syndrome children who attended the Model Preschool during the years in question. Little additional benefit could be gained by including those children in this investigation.

2. In attendance for less than 6 months. Some children attended programs at the Model Preschool Center for only brief periods--usually for purposes of in-depth diagnosis or in order to devise a program prescription which could then be implemented elsewhere. Although the Model Preschool Program undoubtedly had some impact upon the development and future success of such children, both the nature and determinants of impact in such cases would be quite difficult to ascertain.

3. Are not presently attending a school program within one-hour's driving time from the University of Washington. This restriction was deemed necessary in order to keep the costs of data collection within reasonable bounds; only a few children were affected by this restriction. Unfortunately, the restriction obviated the inclusion of any children who were located in remote or rural school programs; and the results of this investigation are, therefore, generalizable only to relatively high-density urban and suburban populations.

When considering these additional criteria, 218 possible subjects were identified in the Model Preschool files. To facilitate analysis, at least 100 subjects needed to be included in the investigation. There was little difficulty in locating and gaining consent for participation of that number. Of course, attrition had an effect and ultimately 116 graduates of the Model Preschool were studied. The exact number was determined by eliminating school districts which had an insufficient number of subjects; by the inability to locate or contact parents within the district; and, in a small number of cases, by the inability to gain consent from parents for their child to participate in the study.

As can be seen in Table 1 (Target Population), the 218 possible subjects were located in 18 school districts. In order to facilitate the gathering of demographic and program data on each of the selected subjects, those districts with fewer than five Model Preschool graduates were eliminated from further consideration. Table 1 (Original Sample) provides a breakdown of the major districts within one hour's drive of the University which have five or more graduates.

TABLE 1

Distribution of Samples by School District

School District	Target Population	Original Sample	Sample Located	Data Sample
Excluded Districts*	19			
Bellevue	11	11	9	9
Edmonds	12	12	4	2
Highline	8	8	10**	7
Issaquah	5	5	6**	6
Lake Washington	11	11	9	8
Northshore	8	8	5	5
Renton	10	10	5	4
Seattle	115	115	70	60
Shoreline	19	19	17	15
TOTAL	218	199	135	116

* Nine districts were excluded because each contained less than five subjects

** Graduates transferred from another district

From this total of 199 subjects, all graduates who could be located, whose parents would give consent, and who would complete the demographic information were potential participates in the study.

A list of subjects in each school district was sent to the Special Education Director of that district. Prior contact had established assurances of cooperation and understanding of the purpose of the study. From the original sample of 199 graduates, 135 graduates were located within the nine school districts by the Special Education Directors (see Table 1, Sample Located).

These 135 subjects made up the sample from which trained personnel contacted parents for consent to participate in the study. Eleven parents declined to participate; five graduates had very recently moved from the district; and interviewers were unable to contact three parents. In total, 19 graduates were lost, leaving a final sample of 116 graduates. These graduates are indicated under Data Sample in Table 1.

Descriptively, the data sample is similar to the Model Preschool target population. Table 2 breaks out the characteristics of the target population and the data sample indicating the percent of change within each characteristic.

TABLE 2

Characteristics of Target Population and Data Sample

Characteristics		Target Population	Data Sample	Change
Sex	Male	70%	75%	+5%
	Female	30	25	-5
Age (June '77)	5-7	27	10	-17
	8-10	45	51	+6
	11-13	24	33	+9
	14-16	4	6	+2
First School Placement	Public School Sp. Ed.	54	58	+4
	Public School Reg. Ed.	41	42	+1
	Preschool	5	0	-5
Handicapping Condition	Mentally Retarded	18	15	-3
	Sensory Impaired	11	15	+4
	Physically Impaired	3	1	-2
	Communication Disabled	52	53	+1
	Behavior Disabled	9	10	+1
	L.D./N.I.*	7	6	-1

* Learning disabled/neurologically impaired

At the time of their acceptance into the Model Preschool program, the data subjects ranged in age from 2 years to 6.5 years. Only six subjects were older than 5.5 years; the median age at entrance was 4.5 years.

Subjects remained in Model Preschool programs for a median of 1.5 years, ranging from .5 to 4 years. Sixty percent of the potential subjects were in a program between .5 and 1.5 years. Children ranged in

age from 3 years to 7.5 years at the time they left the Model Preschool Center. Median age at the time of "graduation" was 5.5 years--comparable to the age at which normal children would enter school programs.

When the study began, children being considered as subjects had been out of the Model Preschool Program for a median of 3.4 years, with a range from .5 years to 7.0 years. All children had been out of the program for a minimum of 1.5 years at the time the study was completed. Dependent upon the age of the child, graduates of the Model Preschool Program were placed in public preschools, kindergartens, or primary-level programs. In a few cases, children were placed in Head Start programs. Forty-two percent of the children were placed in regular programs for "normal" children, the rest were placed in special education programs. Table 3 indicates other noteworthy characteristics of the data sample.

TABLE 3

Demographic Characteristics of Data Sample

Characteristic	Mean	Percent
Intelligence Pretest	78	
Rooms in Home	7	
Adults in Home	2	
Minors in Home	3	
Older Siblings	1	
Father's Education	15	
Mother's Education	14	
Father Unemployed		4
Father Absent		10
Mother Employed		54
Father's Occupation		
Unskilled		20
Semiskilled		28
Own/Manage		15
Professional		37
Child's Race		
Caucasian		84
Black		10
Other		6

Other characteristics of these subjects are described in the Case Study Document Appendix A. Other characteristics of the Model Preschool are described in Appendix B.

Contrast group. The second target population consisted of 76 children who did not attend preschool programs at any time. Achievement test data were gathered on these students who were all in special education classes from a nearby school district. School data gathered on

these subjects was used as normative information in assessing the achievement level of a sample of Model Preschool graduates. Table 4 depicts a break-out of this sample and the Model Preschool graduates by comparable characteristics. As the contrast group was not a matched group, most comparisons were made on matched sub-groups, e.g., grade level, educational placement, or diagnosis.

TABLE 4

Characteristics of Model Preschool Graduates and the Contrast Group

Characteristic	Graduates N=116	Contrast N=79
Sex		
Male	75%	68%
Female	25	32
Age*		
5-7	10	1
8-10	51	51
11-13	33	38
14-16	6	0
Educational Placement		
Regular	32	0
Special	68	100
Diagnosis (Special Education only)		
Mentally Retarded**	29	22
Sensory Impaired***	14	0
Communication Disability	22	14
Behavior Disability	11	20
Learning Disability	11	35
Neurologically Impaired	11	9
Autistic	1	0

* Age in June, 1977
** Mildly and moderately retarded
*** Deaf and profoundly hard of hearing

Instruments

Three data collection instruments were developed by the project staff: a parent permission form, a case history form, and a performance assessment form.

The parent permission form was designed to provide a short explanation of the project to parents, the potential benefits to be derived from it, and the procedures used by the project staff. The form also described the extent of confidentiality and the procedures for protection against disclosure of information from individual returns, including the disposition of the completed report forms.

Case history forms were used to provide data which describe the child's basic characteristics, his family, and his environment. More specifically, this form provided personal demographic data, family demographic data, diagnostic information, program history, and present program data. This data collection form was constructed in a manner which facilitated the quantification and computerization of all information.

Performance assessment forms were constructed once all the appropriate tests were identified. This form was strictly a record keeping form to be utilized specifically as an input device to the computer. On these forms were recorded information about test types, dates, and scores.

Procedures

It was not the immediate purpose of the research study to create or alter any condition, but rather to document whatever conditions existed in the preschool and post-preschool environment of these handicapped children. No direct attempt was made to experimentally manipulate any variables, to influence the nature or content of any preschool or school program, or to influence placement of any child within any program. While the research *per se* was totally non-interventional the information thus obtained will prove of value in the eventual construction of more appropriate preschool and school programs.

Initially, the majority of the project activities were directed toward identification of potential subjects for research. See Subjects section, above.

Once subjects were identified, professional school district personnel were trained to gather demographic and assessment data. Each staff member from the school districts participated in a 75-minute training session with the project coordinators which established the purpose of and the guidelines for the interview and data collecting procedures. Coordinators discussed means of establishing rapport, of eliciting specific responses, and of checking for clarification. Also discussed were methods whereby the interviewer could obtain responses without furnishing words or ideas, and without appearing to evaluate the interviewees' responses.

Professional personnel from the local school districts then contacted parents within their own district to acquire their consent to

have their child's progress studied and to gather demographic information. All demographic information was gathered through a direct interview with one or both parents or guardians. In most cases the interview took place in the local school building and in some cases in the parent's home. In all cases where consent for interviews were given, parents were cooperative and willing to answer all information on the demographic form. These same staff searched the school records to gather achievement data. At this time, data concerning the child's medical history and dates of educational programs gathered through parent interviews were cross checked.

Through examination of each graduate's file at the Experimental Education Unit, staff gathered information on all standardized ability tests which were given to the pupil upon entrance to or during his/her preschool program. The dates and types of tests given were recorded on the performance assessment forms and again medical history and dates of educational programs were cross checked with the parent interview form.

Data on the contrast group were gathered from a local school district. The Special Education Director of this district provided achievement test information on all subjects attending special education programs within the district. Subjects' names were cross checked to eliminate from the sample all children who had previously attended a preschool program. The remaining subjects were then included in the study. This information on dates and types of achievement tests was also recorded on the performance assessment forms.

Demographic data which could be gathered from school records was also recorded on these subjects. These included mainly diagnostic information, program history and present program data.

These demographic data forms and the performance assessment forms were then quantified for computerization. This information, compiled for each child, comprised the basic data sets used in analysis.

CHAPTER 3

RESULTS

The Data and Their Treatment

Three criteria were used to determine the extent to which the benefits of the preschool experience at the Model Preschool were maintained one or more years following graduation: present school placement, gain scores (cognitive growth scores and receptive language growth scores), and present achievement performance in relation to a contrast group.

In order to determine what preschool/post-preschool features were most beneficial in maintaining or increasing preschool benefits, selected variables were examined in relation to each of the criteria. These variables included child variables, performance variables, preschool and post-preschool variables. Although most effort was placed in examining post-preschool variables, it was often impossible to determine the relevance of those variables without first examining a similar preschool or related child variable.

Present School Placement

Present school placement, the first criterion used to assess the benefits of the preschool experience, was determined by examining school records and noting whether the subject was currently in a regular or special education program. Although it is obvious that many non-performance variables affect present school placement (i.e., school district philosophy, programs and funding available, parental pressure), this criterion of performance, however general, remains important to parents, teachers, and special education personnel.

School records indicated that of 127 children on which this information was gathered, 34% were currently in regular education, and 66% were currently placed in special education programs. These figures alone show that 34% of the children who attended the Model Preschool program because of previously diagnosed handicapping conditions are now able to function in a regular classroom placement. This is encouraging, but it is incomplete unless an attempt is made to determine what child, school, or performance variables distinguish this group of regular education students from their special education counterparts. Four variables were statistically and descriptively evaluated in relation to class placement. They were: preschool diagnosis of handicapping condition, present diagnosis, post-preschool intelligence test scores, and grade level.

Diagnosis. The 116 children in this study represent a wide range of handicapping conditions. Upon entering or during enrollment in the Model Preschool program, the handicapping condition(s) of all subjects was diagnosed. This diagnosis, although as accurate as possible, was used primarily for initial placement and record keeping purposes. We were aware that the diagnosis of young handicapped children is tenuous

at best, and that these diagnoses become more exact as skills emerge and more accurate evaluations can be obtained. With this in mind, it became apparent upon examining the data on these subjects, that the diagnosis oftentimes did change as the child progressed in the post-preschool setting. Thus, a child initially diagnosed as communication delayed might later be diagnosed as learning disabled, or a child initially diagnosed as retarded might later be diagnosed as neurologically impaired. Consequently, many subjects have had more than one diagnosis. The major portion of this study evaluates the child in terms of his or her current diagnosis. However, in order to determine the relationship between and the importance of initial verses current diagnosis, these two diagnostic variables were compared.

Table 5 breaks down these diagnosed handicapping conditions, indicating the proportion diagnosed with each handicapping condition within the preschool as opposed to the post-preschool setting.

TABLE 5

Subjects by Diagnosed Handicapping Condition Within Preschool and Post-Preschool Settings

Handicap	Preschool N=116	Post-Preschool Special Ed. N=79
Mentally Retarded*	15%	29%
Sensory Impaired**	15	14
Communication Disabled	53	22
Behavior Disabled	10	11
Learning Disability	3	11
Neurologically Impaired	3	11
Autistic	0	1
Orthopedically Impaired	1	0

*Mildly and moderately retarded.
**Deaf and profoundly hard of hearing

Although it is obvious that diagnoses did change, only the comparison between the preschool and post-preschool communication disabled subjects was significantly different ($z=2.27$, $p(z)<.01$). Because 31% of the communication disabled subjects either had been re-diagnosed or were no longer in the special education setting, an analysis was made to determine if these subjects had a higher probability of entering regular education than subjects with other diagnoses. To do this, an analysis comparing preschool diagnosis to current class placement (regular vs. special) was made to determine the relationship between original diagnosis and present class placement. Table 6 breaks out preschool diagnosis by current class placement.

TABLE 6

Current Placement of Model Preschool Subjects
in Relation to Preschool Diagnosis

Handicap	Regular N	Special N
Mentally Retarded	0	18
Sensory Impaired	5	12
Communication Disabled	25	36
Behavior Disabled	4	8
Learning Disabled*	(1)	(2)
Neurologically Impaired*	(1)	(3)
Orthopedically Impaired*	(1)	(0)
TOTAL	37	79

*These categories are not included in the analysis.

This analysis, including only the first four categories of handicapping conditions, demonstrates a significant relationship between preschool diagnosis and current placement ($\chi^2=11.08$)$P(\chi^2)<.02$). This relationship was accounted for by the divergence between the expected and obtained frequencies in the categories of mental retardation and communication disabled. It would be expected statistically that more subjects diagnosed as mentally retarded would be in regular education and more subjects diagnosed with communication disabilities would be in special education. However, statistical expectancies often differ from educational expectancies, and without yet examining performance variables, it is not altogether unexpected educationally that the 18 subjects diagnosed as mentally retarded would be in special education. The fact that 25 (41%) of the subjects diagnosed as communication disabled are currently in regular education accounts, in part, for the significant divergence between the proportion of subjects diagnosed as communication disabled in the preschool and the proportion with the same diagnosis in the post-preschool special education setting. If the 61 subjects (53%) originally diagnosed as communication disabled were reduced by the 25 subjects who went into regular education (Table 6), then 36 subjects (46%) of the special education sub-group should then be in the special education communication disabled category. As 22% are presently in this category (Table 5), 24% have been rediagnosed.

Although it appears from this analysis that two initial diagnostic categories--mentally retarded and communication disabled--may, in turn, increase or decrease the probability of a special class placement, it cannot yet be assumed that the diagnostic categories alone are of importance. A better understanding can be gained by examining performance variables in relation to both handicapping conditions and class placement.

We see from Table 7 that, as a group, subjects diagnosed as mentally retarded are functioning in the lower range of the special education distribution as measured by standard intelligence tests. Those subjects in regular education diagnosed as communication disabled are functioning higher, though not significantly higher, than those subjects with the same diagnosis in special education. It appears then, as would be expected, that cognitive ability is as closely related to class placement as the initial diagnostic categories per se. The section on cognitive performance below examines this relationship more closely.

Cognitive performance. The analysis of cognitive performance had two goals: to determine (1) the relationship of this performance to regular and special education placements, and (2) the relationship between current handicapping diagnosis and performance.

In order to assess the present cognitive performance of these subjects, scores of the most recent intelligence test* administered to these subjects during the post-preschool setting were analyzed. Eighty percent of the special education subjects and 65 percent of the regular education subjects had a performance measure of this type in the post-preschool setting. In most cases this measurement had been made within the last two years. The mean I.Q. score for the special education students was 75; the mean I.Q. score for the regular education students was 90. Although the difference between these two means was not statistically significant, it is educationally significant; that is, if considered alone, this difference may make the difference between a regular and special education placement.

These data become more relevant when analyzed discriptively to determine the relationship of cognitive performance to current diagnostic categories. Table 7 breaks out the special and regular education mean intelligence test scores by current diagnosis. From this table it is apparent that the means of children in several special education subgroups approach or are beyond the regular education mean.

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*These intelligence tests included Stanford-Binet, W.I.S.C., W.I.P.P.S.I., and P.P.V.T.

TABLE 7

Intelligence Test Scores by Educational Placement and Current Diagnosis

Placement	Diagnosis	Mean Score	Total N	Percent With Tests
Regular Education		90	37	65
	Communication Disabled	91	25	84
Special Education		75	79	80
	Mentally Retarded	63	23	65
	Sensory Impaired	83	10	60
	Communication Disabled	77	17	94
	Behavior Disabled	57	9	69
	Learning Disabled	92	9	100
	Neurologically Impaired	80	10	80
	Autistic	--	1	--

In order to examine these distributions further, Table 8 compares the special education distribution of I.Q. scores to the regular education distribution. This table compares the regular education I.Q. distribution to the special education distribution by indicating the percent of special education subjects, in each diagnostic category, who fall within a particular range of the regular education distribution. The first two columns indicate the percent of special education subjects whose I.Q. score is greater than the regular education median (column 1) and the percent of subjects whose I.Q. score is less than the median (column 2). For example, 7% of the subjects who are currently diagnosed as mentally retarded have I.Q. scores greater than the median I.Q. score (90.5) of the graduates in regular education. Ninty-three percent have I.Q. scores less than this median. The last three columns make the same comparison; however, in these columns the regular education distribution is divided into quartiles. The percent of special education subjects in each diagnostic category whose I.Q. score falls within the upper 25% of the regular education subjects' I.Q. distribution (equal to or greater than an I.Q. of 100) is indicated in column three; those subjects whose I.Q. scores fell within the middle 50% of the regular education subjects I.Q. distribution is indicated in column four and those subjects falling within or below the bottom 25% is indicated in column five.

TABLE 8

Intelligence Test Scores of Special Education Subjects Compared to the Regular Education Intelligence Test Score Distribution

Diagnosis	> Reg. Ed. Median Median = 90.5 I.Q.	< Reg. Ed. Median	Upper Quartile = > 100 I.Q.	Mid 50% 99-82 I.Q.	Lower Quartile = < 81 I.Q.
Special Ed. Total	19%	81%	13%	27%	60%
Mentally Retarded	7	93	0	13	87
Sensory Impaired	17	83	17	33	50
Communication Disabled	19	81	6	38	56
Behavior Disabled	0	100	0	0	100
Learning Disabled	44	56	44	34	22
Neurological Impaired	13	87	12	38	50

It is apparent, from the first column of Table 8, that 19% of the special education subjects are functioning as well as the upper half of the graduates in regular education. When the distribution of the regular education students is divided into quartiles, 40% of the special education students are functioning as well as the upper 75% of the graduates in regular education (column 3 and 4). In examining the subcategories of present handicapping conditions, we see that at least 50% of the sensory impaired, learning disabled, and neurologically impaired are functioning at this level, as are over 40% of the communication disabled subjects. Consequently, it appears that these subjects are continuing to perform well in a special education setting, and that many are there not because of general cognitive disabilities but because of specific disabilities. It may also be true that this setting affords them the special attention and services needed because of their particular disbility. If, as it appears on this table, 40% of the subjects on which performance measures are available (i.e., 25 subjects) are functioning in the upper 75% of an I.Q. range which is acceptable for regular education placement in these districts, it can be concluded that 56% of the Model Preschool graduates either are in regular education or functioning at that level.

The two remaining categories deserve discussion. The 13% of the mentally retarded subjects functioning in the midrange of the regular education distribution is difficult to explain. However, not all districts have yet developed classes for specific disabilities such as communication and learning disabilities. In fact, 35% of the special education subjects were in ungraded self-contained special education classrooms. It may be that these subjects are more comparable to those children currently diagnosed learning disabled or neurologically impaired and would be diagnosed as such if such classes were available.

The low performance of the behavior disordered subjects is genuinely surprising. In checking the records of these subjects, two facts are apparent. First, most of these subjects were diagnosed as behavior disordered while in the preschool (their diagnosis did not change), and almost all subjects received intensive behavioral programming for school readiness while in the Model Preschool. These were active, impulsive subjects whose behavior was difficult to control. While in the preschool, a child's education takes on two phases in order to develop school readiness. Phase I is behavior readiness, i.e., learning to sit, attend, respond, and interact appropriately. Phase II is pre-academic readiness, i.e., learning the basic concepts and skills for academic achievement. Most of these subjects had just completed Phase I upon leaving the preschool. At this time they were of school age and their attending and responding skills had developed appropriately. But unlike their peers, they had little opportunity to become involved in Phase II. It might well be that because in their early preschool years their social and attending skills were such that they could not get deeply involved in the pre-academic readiness skills offered, they were less well prepared for the post-preschool educational experience, and consequently failed to make the progress made by their peers.

Grade level. A third variable that may affect placement in regular or special education is the child's current grade level. Other research has indicated that these students might tend to drift into special

education as they progress through school. Table 9 indicates the proportion of subjects in regular and special education by grade level.

TABLE 9

Percent of Regular and Special Education Subjects at Each Grade Level

Grade Level	N	Regular	Special
Pre-Primary (K)	21	33%	67%
Primary (1-3)	58	36	64
Intermediate (4-6)	34	21	79
Junior High (7-8)*	(3)	(66)	(33)

*This level not included in the analysis.

A χ^2 based upon the frequencies of the first three grade levels was not significant, indicating no significant relationship between grade level and educational placement.

It does appear, however, that a slightly larger proportion of subjects are in special education in the intermediate grade level. When examining the specific diagnoses of these subjects, we found that 59% were diagnosed with specific disabilities, e.g., learning disabilities, neurological impairments, and communication disabilities. It may be that at this grade level a more accurate diagnosis of specific disabilities can be made; consequently, there is a greater movement into special education.

Because most special education classes are ungraded it was difficult to determine the length of time these subjects had spent at any specific grade level (e.g., 1st, 2nd, 3rd grade). However, when cross-checking school entrance dates with general grade-level placement, it appeared that these subjects were progressing through grade levels at the appropriate rate. When examining the regular education student's progress through specific grade levels, only three subjects had records of repeating a grade. It seems that the majority of these subjects are keeping pace with their regular education peers.

Change in class placement. An examination of educational placement changes (i.e., from regular to special education or from special education to regular education) is of interest in determining maintenance of preschool skills.

Upon leaving the Model Preschool Program, 49 graduates were placed in regular education and 67 were placed in special education by post-preschool personnel. Although teachers in the Model Preschool work

closely with parents and special education directors on this placement, the ultimate decision is that of the special education director. In the majority of cases teachers' recommendations were followed.

Presently, however, 37 graduates are in regular education and 79 are in special education. Fifteen subjects changed placements from regular to special education, and three changed from special to regular education. This represents a significant change in placement ($\chi^2 = 6.72$, $P(\chi^2)<.02$). The numbers are small, but it is worthwhile to attempt to determine the variables which may have created this change in placement. Table 10 depicts a descriptive picture of those children who changed from regular to special placements. This table indicates the total number of these "change" subjects in relation to diagnosis; the percent of the total "change" population which is represented by each handicapping condition and the mean I.Q. and gain score of these subjects.

TABLE 10

Descriptive Data on Subjects Who Changed Placement From Regular to Special Education

Variable	N	Percent of "Change" Pop.	Mean I.Q. of "Change" Pop.	Mean of Total Sample Sp. Ed.	Mean of Total Sample Reg. Ed.
Original Diagnosis					
Communication Disabled	12	80			
Mentally Retarded	2	13			
Behavior Disabled	1	7			
Current Diagnosis					
Communication Disabled	3	20			
Mentally Retarded	1	7			
Behavior Disabled	2	13			
Sensory Impaired	2	13			
Learning Disabled	5	33			
Neurologically Impaired	2	13			
Post-Preschool I.Q. Scores				75	90
Total "Change" Subjects			85		
Communication Disabled			86		
Mentally Retarded			95		
Behavior Disabled			49		
Cognitive Growth Scores				-.01	+.46
Communication Disabled			+.82		
Mentally Retarded			-.20		
Behavior Disabled			0		

This table is a small but concrete example of those subjects discussed under Cognitive Performance who are functioning cognitively at a relative high level but who may have been placed in special education to obtain the classroom structure and services which will best meet their needs. The largest proportion of these subjects (80%) were originally diagnosed as communication disabled. However, as was typical with the entire special education sample, many were rediagnosed. Five have been rediagnosed as learning disabled, two as sensory impaired, one as mentally retarded, and one as behavior disabled. The two mentally retarded subjects have been rediagnosed as neurologically impaired. An examination of ability scores and their distribution on Table 11 shows 60% (Column 1 and 2) of these subjects are functioning in the upper 75% of the regular education distribution.

TABLE 11

Intelligence Test Score Distribution of Subjects Who Changed Placement Compared to the Regular Education Intelligence Test Score Distribution

Initial Diagnosis	Upper Quartile = > 100 I.Q.	Mid 50% 99-82 I.Q.	Lower Quartile = < 81 I.Q.
Total "Change" Subjects	33%	27%	40%
Communication Disabled	33	25	42
Mentally Retarded	50	50	0
Behavior Disabled	0	0	100

Only five of these subjects had acceptable pre- and post-tests for the computation of cognitive growth scores. However, of most interest is the fact that all subjects, except one who was diagnosed as behavior disabled, were continuing to grow and had accelerating growth scores beyond 0. (See the next section for a complete discussion of these growth scores). It can be concluded that these subjects, like many of the special education subjects, are performing well in special education.

Gain Scores

The second criterion used to determine if benefits of the preschool experience were maintained in the post-preschool setting was gain scores, or rate of cognitive and receptive language growth. Test data on which these scores were computed were obtained by examining each child's records at the Experimental Education Unit and in the post-preschool setting. The search gave us over 1,300 test scores for 116 children. The tests represented included thirteen types of intelligence tests, six types of general achievement tests, four types of language

tests, six types of reading tests, and four visual-motor tests. Test categories with limited representation were eliminated; thus, the analysis focused on intelligence measures, receptive language measures, and achievement measures.

Intelligence measures--cognitive growth rate. Cognitive growth rate indicates change between pre- and post-test scores on comparable intelligence tests. These rates were calculated by subtracting post-test scores from pre-test scores and dividing this difference by the number of months between testings. If the change between testing was in a positive direction, the resulting growth rate was a positive or accelerating score. If the change was in a negative direction (a lower score on the post-test than the pre-test), the resulting cognitive growth rate was negative or a decelerating score. A zero growth rate does not mean the subjects are not growing cognitively; rather, it means that they are neither accelerating or decelerating. That is, they are growing cognitively at a normal developmental rate. But, this does not necessarily mean that they are functioning at a "normal" level, i.e., with mental age comparable to chronological age; it does mean that regardless of the level at which they are functioning, they are progressing at a normal rate.

Of 116 children included in the sample, 25 had no record of any intelligence testing, and 32 had only one test score recorded. From the remaining 59 children (51% of the sample) two groups were selected for analysis. These two groups were: (1) children administered pre- and post-tests during their stay at the Model Preschool, and pre- and post-tests in the post-preschool settings (preschool/post-preschool); and (2) children with pre- and post-tests at the Model Preschool only (preschool only). Table 12 breaks out the means of all pre- and post-test scores, months between tests, and gain scores for these two groups. For the preschool/post-preschool group, means are broken out for the subjects while they were in preschool and again, for the same subjects in the post-preschool setting. For the preschool only group, only preschool data are available.

TABLE 12

Cognitive Growth Score Variables

Test Group	Pre-test Score Mean	Post-test Score Mean	Months Mean	Growth Score Mean
Preschool/Post Preschool				
Preschool	78.40	85.73	13.40	+.609
Post-preschool	83.87	84.13	18.60	+.083
Preschool Only	75.08	88.68	12.29	+1.480

1. Children administered pre- and post-tests in the Model Preschool and in the post-preschool setting (preschool/post-preschool). The computed cognitive growth scores on this group allowed the comparison of preschool progress with subsequent progress in the post-preschool setting. Fifteen children were included in this sample. An analysis of these cognitive growth scores indicated that the average gain during the Model Preschool placement was +.609 I.Q. points per month. This score indicates .609 months of cognitive growth for each month of life; or, holding all other factors constant, 7.3 months of cognitive growth for each year of life.

The average gain during public school placement was +.083 I.Q. points per month, indicating .083 months of cognitive growth for each month of life.

Figure 1, (Appendix C) represents the growth pattern in the two settings. As indicated by these growth scores and by Figure 1, Model Preschool children made noteworthy improvement in cognitive development growth while in the preschool; in the public school setting they were continuing to grow at a normal developmental rate.

Cognitive growth per month was then analyzed as a function of pre-test scores, both in the preschool and post-preschool setting. A significant correlation was found between Model Preschool pre-tests and preschool gains ($r_{xy}=-.492$, (P) $r_{xy}<.05$). A linear analysis of this distribution suggests the gains made in preschool were at least somewhat dependent upon pre-test scores; children with low pre-test scores made greater gains than children with higher pre-test scores. This trend was not found in the post-preschool setting. A non-significant correlation ($r_{xy}=+.0069$) was found between public school pre-tests and public school gains.

Both statistical and educational explanations can be given for the negative correlation between preschool pre-test scores and preschool gains. From a statistical point of view regression toward the mean bears consideration. It may be that the low initial test scores of some children did not represent true functioning ability and the higher post-test score was more indicative of this ability. However, regression toward the mean is a statistical concept, and educational explanations may be more enlightening.

Educational analyses of the programs in which these children exhibited growth provide additional explanations. Many of these children entered the Model Preschool programs because of a recognized difference between actual and potential performance. This difference became apparent after both educational and psychological evaluations. Individualized programs concentrating on specific disabilities, viz., communication, motor, or social, tended to minimize this difference; thus allowing each child to perform higher and closer to true ability on later evaluations. Without minimizing this difference, it is debatable whether these children would ever perform close to true ability level.

In addition, those children who were functioning lower in ability areas received more intensive programming in smaller groups. It is the

goal of Model Preschool programming to provide intervention in those areas where skills are weakest. The weaker the skills the more intensive the programming in order that each child should function as close to potential ability as possible. Those children without specific weaknesses and who appear to be functioning close to true ability level are given more general kindergarten readiness programs concentrating on improving all areas. Consequently, the effect of intervention may indeed be differential, depending upon the divergence between specific and general abilities; those children who show the greatest divergence and consequently are higher risks for failure reap the greatest benefits.

In the post-preschool program, it appears that once a child has reached a higher level of functioning this level is maintained. The child then has the ability to keep pace with other children functioning at this performance level. But without this "catching up" intervention it is possible that the divergence between actual and true performance would continue or would widen.

Although these results indicate that preschool cognitive growth gains were maintained, the second objective, i.e., what post-preschool features account for the maintenance of these gains? could not be readily answered with this sample. We intended to answer this question by classifying the children into groups who were maintaining cognitive gains and/or who were accelerating or decelerating. How large a score must be to be indicative of significant acceleration or deceleration is an educational question; but we believed that a minimum of $\pm .5$ I.Q. points a month would actually indicate significant acceleration or deceleration. Fifty-three percent of the subjects had acceleration or deceleration scores equal to or less than $\pm .5$ I.Q. points a month, and once the remaining number of subjects was divided into handicapping conditions, class placement, or into other variables, the number was too small for adequate analysis. Because most children were performing at about the same level, and scores were clustering close to the mean, a classificiation of subjects was not possible. In order to examine this group, however, information was broken out discriptively. Table 13 outlines this descriptive information and allows some general conclusions to be drawn.

TABLE 13

Descriptive Post-Preschool Variables of the Preschool/Post-Preschool Group

Variable	N	Growth Score
Class Placement		
Regular	3	+.46
Special	12	-.01
Handicap		
Communication Disabled	5	+.15
Neurologically Impaired	3	+.29
Mentally Retarded	1	-.20
Learning Disabled	2	+.12
Behavior Disabled	1	0
Grade Level*		
Kindergarten	2	-1.30
Primary	7	+.12
Intermediate	3	+.18

* Special education subjects only

As Table 13 shows, the difference between pre and post intelligence tests for these special education subjects resulted in a slightly decelerating score, but for this small group of graduates in regular education, the cognitive growth score continued to accelerate. This special education growth score, while slightly decelerating is essentially 0 and indicates that these subjects are probably "holding their own." That is, they are neither accelerating or decelerating cognitively. Subjects currently diagnosed as communication disabled, learning disabled, and neurologically impaired have a cognitive growth score higher than the growth score of the total sample (+.083) and are continuing to accelerate. These were the same subjects who had the highest intelligence test scores when cognitive performance was analyzed (see Table 7). Although the N is small, it appears that these special education subjects experienced a deceleration in growth immediately after school entrance and an increase in cognitive growth at the next grade level.

2. Children administered pre- and post-test in preschool (preschool only). Another group of preschool subjects was identified who had pre- and post-test only in preschool. This group totaled 38 children, and thus would allow for analysis of growth only while in preschool. The average gain during preschool for this group was 1.48 I.Q. points per month. A non-significant correlation (rxy-.149) was found between pre-test and preschool gains. A comparison of this group of children with those preschool subject in the preschool post-preschool sample indicated no significant difference in terms of pre-test score, post-test score, or gain score, suggesting that both groups were drawn from the same population and could be combined. The mean cognitive growth score of

this combined group was +1.09. However, in examining the combined scores of these 53 subjects, only 7 subjects had decelerating scores, and only two scores were greater than -.5. Consequently, a classification of this group into groups of subjects who were maintaining and/or accelerating or decelerating for an analysis of variables related to maintenance of gains was, again, not possible.

However, this combined preschool group was analyzed in terms of original diagnosis. Because those subjects who made gains in the Model Preschool maintained those gains in the post-preschool setting, this analysis attempted to determine which diagnosed handicapping condition had the highest probability of making and maintaining gains. Table 14 breaks out this information by original handicapping conditions.

TABLE 14

Cognitive Growth Scores by Original Handicapping Conditions

Handicap	N	Growth Score
Communication Disabled	39	+1.44
Sensory Impaired	2	+ .91
Neurologically Impaired	1	+ .90
Mentally Retarded	6	+ .85
Behavior Disabled	5	+ .35

From this breakdown it can be concluded that those subjects originally diagnosed as communication disabled made the most gains, and those subjects diagnosed as behavior disabled made the least gains even though showing an accelerating score. This information is consistent with information found under Diagnosis which indicated that a high proportion of subjects diagnosed as communication disordered were placed in regular education, and that subjects originally currently diagnosed as behavior disabled were performing least well.

Secondly, these subjects were analyzed in terms of present class placement (regular or special) to determine if any relationship could be found between the rate of original gains and present placement. Children (N=23) who were placed in regular education were, while in preschool, making cognitive gains at the rate of +1.66 I.Q. points per month. Those placed in special education (N=30) were gaining at the rate of +.863 I.Q. points per month while in preschool. This statistically significant difference ($t=2.36$ $(P) < .05$) indicates that those subjects placed in regular education made gains at twice the rate while in preschool as those subjects placed in special education.

Receptive language measures--receptive language growth rate. Gain scores were also calculated for receptive language; these measures provide a receptive language growth rate. Receptive language growth rate indicates change between pre- and post-testing scores on comparable language development tests.* As these scores were reported in months of language development; each score was divided by the child's chronological age then multiplied by 100. When this is done, a score of 100 will indicate that receptive language equals chronological age. As with cognitive growth rate, a score can indicate maintenance of language development if it equals zero, or it can be accelerating or decelerating if the difference is positive or negative.

Of the 116 children in the original sample, 11 had no record of any receptive language testing; 16 had only one score reported. Two groups were selected for analysis from the remaining 89 children. One group included children with pre-tests and post-tests while at the Model Preschool and in the post-preschool setting (preschool/post-preschool). The other group included children with pre-tests and post-tests only in the Model Preschool (preschool only). Table 15 breaks out the means of all pre- and post-test scores, months between tests, and gain scores for these two groups.

1. Children administered pre- and post-test in the Model Preschool and in the post-preschool setting (preschool/post-preschool). Sixteen children met the criteria of pre- and post-tests at the Model Preschool in the post-preschool setting. Receptive language growth scores for these children allowed the comparison of preschool progress with subsequent progress in the post-school setting. An analysis of these receptive language growth scores indicated that the average gain during the Model Preschool placement was +.368. This score indicates .368 months of receptive language growth for each month of life. The average growth during public school placement was -.110. Figure 2 (Appendix C) represents the growth patterns of the two settings. As indicated by these growth scores and by Figure 2, Model Preschool children grew in receptive language while in the preschool, but in the public school setting the score was slightly decelerating.

*These tests included the Sequenced Inventory of Communication Development and the Peabody Picture Vocabulary Test.

TABLE 15

Receptive Language Growth Score Variables

Test Group	Pre-test Score Mean	Post-test Score Mean	Months Mean	Growth Score Mean
Preschool/Post-Preschool				
Preschool	64.06	69.06	15.25	+.368
Post-preschool	71.56	72.00	18.50	-.110*
Preschool Only	68.00	77.58	11.11	+1.055

*Because growth scores are computed individually for each child, they can be decelerating scores; although means, computed as a group score, appear to accelerate.

Receptive language growth per month was again analyzed as a function of pre-test scores, both in the preschool and post-preschool setting. A significant correlation (rxy=-.492, (P)<.05) was found between Model Preschool pre-tests and preschool gains. A linear analysis of this distribution suggested the gains made in preschool were at least somewhat dependent upon pre-test scores; children with low pre-test scores made greater gains than children with higher pre-test scores.

This trend was not found in the post-preschool setting. A non-significant correlation (rxy-.2546) was found between public school pretests and public school gains.

Again, both statistical and educational explanations can be given for negative correlation between preschool pre-test scores and receptive language growth scores. Alternative explanations are similar to those offered for intelligence test results. Great emphasis is placed on communication development in all Model Preschool programs; one program, consisting of four classrooms, specifically serves the communication disabled child. There can be little doubt that this educational structure would account for some portion of the gains made by these subjects.

In the post-preschool program, with receptive language as with cognitive development, it appears that once the child has reached a higher level of functioning he or she is able to maintain this level. Even though the score decelerated slightly, these children, for the most part, have the ability to keep pace with other children functioning at their ability level.

From Table 16 we see that when receptive language gains are broken into variable subgroups the sample size becomes too small for anything other than a descriptive analysis. However, this analysis does enable us to draw some general conclusions about the sample.

The difference between pre and post intelligence tests for the special education subjects resulted in a slightly decelerating score;

for the small group of graduates in regular education the difference was also negative or decelerating. In fact, unlike the cognitive growth sample, this small group of regular education students tended to depress the group score and did not perform as well as special education subjects. Subjects currently diagnosed as communication disabled have a receptive language growth score higher than the growth score of the total sample (-.110) and appear to be continuing to accelerate. Again, although the n is small, these subjects appeared to make more gains in receptive language as they increased in grade level and like the cognitive growth sample there is deceleration in growth immediately after school entrance.

TABLE 16

Descriptive Post-Preschool Variables
Preschool/Post-Preschool Group

Variable	N	Growth Score
Class Placement		
Regular	3	-.56
Special	13	-.01
Handicap		
Communication Disabled	6	+.37
Sensory Impaired	1	+.11
Neurologically Impaired	1	-1.13
Mentally Retarded	3	-.70
Learning Disabled	1	+.83
Behavior Disabled	1	-.07
Grade Level*		
Kindergarten	5	-.50
Primary	4	+.25
Intermediate	4	+.50

* Special education subjects only

2. Children administered pre- and post-tests in preschool (preschool only). Again, the two preschool groups were combined (preschool subjects from the preschool/post-preschool sample and preschool subjects from the preschool only sample). A comparison of these two groups of preschool children indicated no significant differences in terms of pre-test score, post-test score, or gain scores, suggesting that both groups were drawn from the same population. The combined gain score for these groups was +.874. Because 85% of these subjects were originally diagnosed as communication disabled, little could be gained in analyzing this group in terms of original diagnosis. However, removing the gain scores of the two subjects diagnosed as mentally retarded (-.15), and seven subjects diagnosed as sensory impaired (+.735) raises the gain for

the communication disabled group only slightly to +.954. These preschool subjects were divided into groups which subsequently went into special or regular education, and once again there was a slightly higher, but not significant, gain score while in preschool for regular education subjects (+.957) over special education subjects (+.73).

Achievement Measures

Achievement measures were analyzed separately in terms of spelling tests, reading tests, and arithmetic tests. Table 17 breaks out the pertinent data in these areas.

TABLE 17

Areas of Achievement Comparison Between Model Preschool Graduates and Contrast Group

Area	N	Pre-test Mean	Post-test Mean	Gain Mean
Spelling*				
Graduates	21	31.19**	31.38**	-.10
Contrast	76	16.49	16.23	+.16
Reading				
Graduates	25	45.12**	37.80**	-.51
Contrast	76	25.13	24.96	+.16
Arithmetic				
Graduates	25	28.16**	27.96	+.16
Contrast	76	18.86	22.21	+.48

*All achievement test scores are reported in percentiles
**Differences between the means of graduates and contrast subjects significant at .05 level

All subjects (N=25) who had a pre- and post-test on comparable achievement tests in the post-preschool setting were selected for analysis. Seventy-six students in the special education program of a nearby school district served as the contrast group. These subjects had no preschool experience. Table 18 breaks out the descriptive variables of this contrast group and the Model Preschool sample. (See Sample for details of the contrast group.)

TABLE 18

Descriptive Variables of Model Preschool Graduates and Contrast Group

Variable	Graduates Reading/Math N	Spelling N	Contrast N
Total	25	21	76
Regular Education	10	5	0
Special Education	15	16	76
Current Diagnosis			
Communication Disabled	8	8	11
Learning Disabled	2	2	25
Neurologically Impaired	1	1	8
Mentally Retarded	3	4	17
Behavior Disabled	1	1	15
Grade Level			
Primary	8	8	22
Intermediate	7	8	54

As can be seen by the summative data on Table 17, in each skill area the average achievement growth per month for the graduates was less than for the contrast group. However, none of these differences were statistically significant. In each skill area the average pretest score was higher for the graduates than for the contrast group. Each of these differences was statistically significant at the .05 level. In each skill area the average post-test score was higher for graduates than for the contrast group. Differences in spelling and reading were statistically significant, but differences in arithmetic post-test scores were not significant.

Achievement growth of graduates who are currently in regular education was then compared to the achievement growth of those graduates who are currently in special education. As can be seen in Table 18, the size of the N varies depending upon the achievement area considered. In each skill area, there were no significant differences in average achievement growth per month when regular education graduates were compared to special education graduates. In each skill area the average pretest score was higher for regular education graduates. Each of these differences was statistically significant at the .05 level. The average post-test score was significantly different at the .05 level only in spelling. In reading and arithmetic there were no significant differences in post-test scores.

As Table 18 shows, reasonable comparisons of handicapping subgroups can be made only with the group diagnosed as communication disabled. In

each achievement area, the average achievement growth per month for the graduates currently diagnosed as communication disabled was higher than for the contrast group with this same diagnosis. However, none of these differences was statistically significant. In each skill area the average pretest and post-test scores were higher. Differences in both pretest and post-test scores were significant at the .05 level for reading and arithmetic.

Graduates in special education were then compared to contrast subjects in special education by primary and intermediate grade level. As can be seen in Table 19, these results were less clearcut. In general, achievement gains for graduates were less than for the contrast group at the primary level, and equal to or greater than the contrast group at the intermediate level. However, none of these differences were statistically significant. At the primary level, pretest scores were significantly higher in spelling and reading. At the intermediate level, pretest scores tended to be somewhat higher but not significantly higher. Post-test scores at the primary level tended to be lower for the graduates than for the contrast group, but again differences were not significant. Post-test scores at the intermediate level tended to be higher for the graduates that for the contrast group but not significantly higher. It would appear that graduates' achievement scores decelerated at the primary level but were again beginning to accelerate at the intermediate level. However, the lack of statistical significance precludes any definitive statement.

TABLE 19

Achievement Test Gains by Grade Level for
Model Preschool Graduates and Contrast Group

	Graduates			Contrast		
Achievement Test	Pre-test	Post-test	Gain	Pre-test	Post-test	Gain
Spelling						
Primary	36.25	27.50	-.77	18.68	24.50	+.73
Intermediate	12.75	15.50	+1.00	15.83	14.04	+1.00
Reading						
Primary	44.25	33.38	-1.35	27.59	36.09	+1.14
Intermediate	29.00	29.14	+.71	24.15	20.42	-.26
Arithmetic						
Primary	20.12	27.00	+.76	24.00	33.68	+1.11
Intermediate	17.57	13.14	-.19	16.92	18.13	+.17

Conclusions

Data in this study were analyzed to answer two questions:

1. To what extent are benefits (e.g., child achievement gains) of a preschool experience maintained one or more years following preschool experience?

2. What post preschool settings and/or features of those settings are most beneficial in maintaining or increasing preschool benefits?

To answer the first question, three criteria were used to determine if benefits were maintained. They were: school placement (regular vs. special education), gain scores (measures of cognitive growth and measures of receptive language growth), and achievement scores (measures of achievement in relation to a contrast group). Selected variables were then examined in relation to each of the three criteria to determine those variables most likely to contribute to the maintenance of benefits.

Maintenance of Preschool Benefits

The results suggest that benefits of the preschool experience were maintained as evidenced by data indicating that:

- Thirty-four percent of the graduates were in regular education classrooms.

- An additional 22% of the graduates, although placed in special education with diagnoses of special disabilities, were functioning as well cognitively as the upper 75% of the graduates in regular education.

- Those graduates in regular education were not repeating grades but were keeping pace with their regular education peers.

- Cognitive growth gains achieve during preschool were maintained in the post-preschool setting.

- In all achievement areas when compared to a contrast group, pretest scores were significantly higher; most, though not all, posttest scores were significantly higher; gains, however, were not significantly different.

Variables Related to Maintenance of Benefits

Although maintenance of gains was relatively easy to document, it was far more difficult to find clear-cut child or school variables which might be related to the maintaining these gains. This difficulty, previously encountered by other researchers, rests on the fact that a multitude of possible variables exist, and the interaction of these variables may indeed be different for each child (see Case Study Document, Appendix A). However, an attempt was made to determine variables significantly related to each of the three criteria.

Class placement. In this study original diagnosis was significantly related to class placement (regular vs. special), with those subjects diagnosed as mentally retarded having a high probability of entering special education classes and those subjects diagnosed as communication disabled having a higher than expected probability of entering regular education programs. Although class placement appeared to be related to intellectial ability, there was no significant difference between the I.Q. scores of those subjects in special education and those subjects in regular education. There was, in fact, a great deal of overlap in the distribution of intelligence scores; and many of the subjects in special education diagnosed with specific disabilities performed as well cognitively as the upper 75% of the graduates in regular education. Also, no relationship was found between grade level and class placement, indicating that subjects are not tending to drift into special education as they progress into higher grades. In analyzing cognitive gain scores, a significant relationship was found between the rate of cognitive gains in preschool and future class placement. Those subjects who were in regular education made significantly greater gains while in preschool than those subjects in special education. This same relationship was also found in analyzing receptive language gain scores. In this case, the rate of gains while in preschool was higher, but not significantly, for those subjects who went into regular education in the post-preschool setting. Consequently those variables significantly related to regular or special education classroom placement in the post-preschool setting were original diangosis and rate of cognitive gains while in preschool.

Gain scores. In evaluating those variables related to cognitive and receptive language gain scores, only the level of cognitive or receptive language performance at the preschool level was significantly related. Those subjects with lower pretest scores made the greatest cognitive and receptive language gains. This relationship did not hold in the post-preschool setting. However, since gains made in preschool were maintained in the post-preschool setting, preschool gains and consequently entry level into the post-preschool setting are of great importance. Class placement, diagnosis and grade level were evaluated descriptively. However, few definitive statements can be made regarding these variables because of inadequate sample size. Of most relevance was an indication that gain scores decelerated immediately upon school entrance and again began to accelerate in the primary and intermediate grade levels.

Achievement measures In evaluating achievement measures those graduates in regular education were performing significantly higher than those graduates in special education on all achievement pre-tests. Post-test scores were significantly higher in both spelling and reading. Rate of achievement gains was not significantly different. Class placement, diagnosis, and grade level were evaluated descriptively. Again, as with cognitive and receptive language gain scores, it appears that these subjects may decelerate initially and again begin to accelerate at more advanced grade levels.

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APPENDIX A

EFFECTIVENESS OF EARLY EDUCATION FOR HANDICAPPED CHILDREN
A CASE STUDY DOCUMENT

A Description of the Model Preschool Sample

Introduction

Preschool children enrolled in the Model Preschool Program at the Experimental Education Unit between the years of 1968 to 1976 were the subjects of a study on the effectiveness of early education for handicapped children. The sample consisted of 116 children who at the time of the study were in public school and 5-15 years of age. The purpose of the following case study document is to describe the population which was involved in this study.

The purpose of the Effectiveness for Early Education study was to investigate and assess the effects of early preschool programming on handicapped children. This research had three goals: (1) to locate children formerly enrolled in the Model Preschool Program at the Experimental Education Unit, (2) to determine to what extent the benefits of a preschool experience are maintained one or more years following the preschool experience, and (3) to determine what preschool and post-preschool features of the child's environment are most beneficial in maintaining or increasing preschool benefits.

Much of the information in this report was collected through interviews with parents or guardians of these subjects. In some cases, as with foster or adopted children, information regarding the child's previous history was unknown. In all cases, however, percentages are based on a total of 116 children. Percentages totaling less than 100 percent indicate those cases where the information requested was not known to the parent or guardian.

Case Study

The child. The Model Preschool at the Experimental Education Unit provides many different programs to meet the specific needs of handicapped children. Because of this, children in this study were diagnosed as having a variety of handicapping conditions. This diagnosis, while as accurate as possible, was mainly for initial placement and record keeping purposes. It was well recognized that the diagnosis of young handicapped children is tenous at best and that as skills emerge and more accurate evaluations are obtained these diagnoses become more exact. It was also recognized that these children had other associated handicapping conditions that were not reflected in this diagnosis. Table 1 breaks out these diagnosed handicapping conditions indicating the percent in each subgroup.

TABLE 1

Handicapping Conditions

Handicap	Percent
Communication Disabled	52.6
Sensory Impaired*	14.6
Mentally Retarded**	15.5
Behavior Disabled	10.3
Neurologically Impaired	3.4
Learning Disabled	2.6
Orthopedically Impaired	.9

* Deaf and profoundly hard of hearing
**Mildly and moderately retarded

Seventy-five percent of the children are males, twenty-five percent are females. Caucasians make up 84.5% of the sample; 9.5% are Black and 6.1% are other nationalities. The largest proportion (44%) of the children live in a urban setting; 28.4% live in the inner city; 23.3% live in smaller communities (population 2,600-49,000); and 4.3% come from rural areas.

Table 2 breaks out the birth order of the subjects in the sample.

TABLE 2

Birth Order

Birth Order	Percent
First born	36.2
Second born	25.0
Third born	19.0
Fourth born	5.2
Fifth born	4.3
Sixth born	2.6
Seventh born	.9
Unknown	6.8

The mean weight at birth was 5.9 pounds, the range was one to eleven pounds. Most of the children (73.3%) were full-term; 17.2% were

premature; 75.9% were delivered normally; 4.3% were cesarean; and 7.8% had abnormal deliveries.

Tables 3 and 4 delineate these and other birth and health factors.

TABLE 3

Birth Data

Birth Data	Percent	Mean	Range
Weight at birth		5.9	1-11
Hours in labor		9.06	1-48
Days in hospital		8.15	1-11
Full-term	73.3		
Premature	17.2		
Normal delivery	75.9		
Cesarean	4.3		
Abnormal delivery	7.8		
Oxygen at birth	19.0		
Incubator at birth	24.1		
Surgery at birth	7.8		
Prenatal complications	28.4		
Cry at birth			
Yes	62.1		
No	9.5		
Unknown	28.4		

TABLE 4

Health History

Health Problems	Ever Occurring	Reoccurring	Hospitalized	Total
Ear Infections	16.4%	37.9%	13.8%	68.1%
Allergies	16.4	28.4	3.4	48.2
Serious Respiratory Infections	21.6	14.7	8.6	44.9
Vision Problems	12.9	10.3	4.3	27.5
Convulsions	21.1	8.6	5.2	25.9
Intestinal Problems	7.8	10.3	3.4	21.5
Heart Disease	6.9	2.6	3.4	12.9
Other Health Problems	9.5	15.5	6.9	31.9

The parents. One unique aspect of this population is the demographic information on the family. Most of the children (78.4%) live with both parents, 12.1% live in single-parent families, and 8.6% live with adoptive or foster parents, or other relatives. One child lives in a group home. The mean number of children in these families is 2.61 with a range of 1-7.

The mean level of mothers' formal education is 13.6 years with a range of 0-23 years; for the fathers, the mean is 15.4 years with a range of 3-24 years. When asked if they had ever been in special education, 9.5% of the mothers and 4.5% of the fathers reported they had attended special education classes. Eighty percent of the fathers are employed full-time, of those 37.1% reported professional level occupations. Of the mothers, 26.7% have full-time employment, 27.6% part-time employment, and 45.6% are unemployed. Of those mothers employed, 20.7% reported professional positions.

The diagnosis. These children were diagnosed as handicapped by a variety of agencies: 47.4% by the Clinical Training Unit of the Child Development and Mental Retardation Center, 7.6% by Children's Orthopedic Hospital, and 44% by a private physician. When asked the type of professional who told them of the handicapping condition: 33.6% reported a pediatrician; 24.1% reported other physicians; 33.6% other health person; 1.7% friend or relative; and 6.9% a teacher or other person. Most parents (90.6%) learned of their child's handicapping condition after the mother and child were discharged from the hospital; however, 3.4% were informed at the time of delivery and 6.0% learned after delivery but prior to discharge from the hospital. Table 5 delineates information the parents were given at the time of diagnosis regarding their handicapped child.

TABLE 5

Information Provided to Parents Regarding Their Handicapped Child

Information Category	Percent
Child's Intellecutal Development	
Handicap would affect child's learning	34.5
No way of knowing intellectual development	26.7
Told nothing about intellectual development	19.8
Other	14.7
Unknown	4.3
Initial Placement Advice	
Child can be helped; find program	69.8
No advice	18.1
Institutionalize immediately	2.6
Child can't be helped; keep at home	1.7
Other	5.2
Unknown	2.6
Handicap Risk in Future Offspring	
Not told	62.9
No risk	12.9
Told unknown	7.8
Less than 5 percent	3.4
6 to 10 percent	.9
Other	4.3
Unknown	7.8

Once identified, the children were enrolled in early intervention programs at the Experimental Education Unit.

The early intervention--The Model Preschool Center for Handicapped Children. The Model Preschool Center for Handicapped Children is part of the Experimental Education Unit of the University of Washington's College of Education and Child Development and Mental Retardation Center. Service is provided for approximately 190 children annually. The children have a wide variety of mild to severe handicapping conditions. The objective is to bring all children as close to normal development as possible and to prepare them for participation in programs in their home communities. Children from birth to six years come to the preschool programs from school district areas in the Puget Sound region.

Model Preschool Programs consist of: Communication Programs which provide preschool classes for children identified as having a communication or language lag, but who may have additional handicapping conditions: Down's Syndrome Programs which are programs designed for Down's Syndrome children with a view to bring their performance as close to developmental norms as possible; Infant Programs which provide services

for infants with severe or moderate developmental lags; Preschool Programs which provide services to children with severe or moderate handicapping conditions or behavioral problems; and Integrated Programs for handicapped children and non-handicapped peers who serve as "models" for normal patterns of speech and behavior.

Of the 166 children 57.7% were originally enrolled in the Communication Preschool Program and 42.3% were originally enrolled in the other Preschool Programs of the Model Preschool. Within these programs, children often transfer to other programs which better meet their emerging developmental needs. Consequently, while they were in the Model Preschool, 7% of the children transferred from the Communication Preschool to the Integrated Preschool, and 6% transferred from the Integrated Preschool to the Communication Preschool before graduation.

The median age at entrance to the Programs was 4.5 years; the median age at leaving was six years. The median duration of enrollment was 1.5 years and the median length of time since leaving the program is, at present, 3.5 years.

Those children who were administered intelligence tests prior to or immediately upon entrance to the Preschool Programs had a mean I.Q. of 78. The number of children with this pre-intervention I.Q. score is less than the total sample, as many of the children were untestable and a valid assessment was not possible. Table 6 shows a breakdown of these children by disability.

TABLE 6

Pre-Intervention I.Q. Scores by Handicapping Condition

Disability	N	Mean	Median
Total Group	51	78	75.5
Communication Disabled	28	79	78.0
Mentally Retarded	10	65	62.5
Sensory Impaired	10	84	74.5
Behavior Disabled	6	87	87.5
Learning Disabled	1	—	—

Cognitive growth scores (gain scores) computed during preschool on those children who had comparable pre- and post-intelligence test scores showed a mean gain of 1.24 points. This gain indicates over one month of cognitive growth for each month of life. Table 7 shows a breakout of these scores by disability.

TABLE 7

Cognitive Growth Scores by Handicapping Condition

Disability	N	Mean Gain	Median Gain
Total Group	53	+1.09	+ .95
Communication Disabled	39	+1.44	+1.24
Mentally Retarded	6	+ .85	+ .65
Sensory Impaired	2	+ .91	+ .91
Behavior Disabled	5	+ .35	+ .22
Learning Disabled	1	—	—

The intervention--post-preschool. Subsequent to their preschool placements, the children were enrolled in nine different school districts. Teachers in the Model Preschool programs made recommendations for the children's placement in public schools. The final decision was made by the school district and the parents, but for the most part, the recommendations were followed. Immediately after preschool, 57.8% were in special education programs; 37.1% in regular education; and 5.2% in regular preschool programs. Current placement information was gathered on 127 children: 34% are currently in regular class placements and 66% in special class placements.

Once the children were enrolled in special education, their diagnosis often changed. Table 8 breaks out the current diagnosis of these subjects.

TABLE 8

Diagnosed Handicap of Subjects in the Post-Preschool Setting

Handicap	Post-Preschool Special Ed. N=79
Communication Disabled	22
Sensory Impaired	14
Mentally Retarded	29
Behavior Disabled	11
Neurologically Impaired	11
Learning Disabled	11
Orthopedically Impaired	0
Autistic	1

Diagnosis, as did education, became more specific as the child progressed in the school setting.

Conclusion

Described in this document are some of the multitude of variables which influenced the educational progress of each child in this study. Research in the field of early childhood education has indicated that some of these variables are significant; others have not been explored. It was not the purpose of this document to indicate significance or the lack of it for any variable, but only to describe.

Because it seems likely that the same variables may interact in different ways with different children, 12 individual case studies conclude this document. Each study exemplifies how some of these variables may influence a child and his progress. Four of these children were originally diagnosed as Communication Disabled, five as Mentally Retarded, and the others as Orthopedically Impaired, Learning and Language Disabled, and Behavior Disabled. Birth history, family structure, and medical history vary considerably. Four are currently in regular education and eight are in special education. Five of the children in special education have been rediagnosed.

Which variables are most important is indeed difficult to determine. The reader may decide.

LARS AND BURT

Lars and Burt are male twins who were born prematurely on November 5, 1963. Lars was born first, and when Burt was born twenty minutes later, it was surprising, as the parents were not expecting twins. Lars weighed four pounds and ten ounces and Burt weighed four pounds, six ounces. They live with their mother, grandmother, and two older brothers; the father is deceased.

Lars and Burt developed normally, except in the area of speech. They used jargon, with an occasional intelligible word, and related most often to each other. When their mother expressed concern to the pediatrician, he advised her to wait until they started school.

They were enrolled in a suburban school district in September of 1969. After three weeks, the school personnel reviewed their findings with the speech therapist, and recommended further intervention. The twins were accepted into the Communication Preschool in November of 1969; they continued to attend their regular kindergarten in the morning.

Both boys showed age-level receptive skills, but 3 year deficits in the expressive area. At the Experimental Education Unit, they received a 2-hour communication class program that included a daily thirty minute individual speech therapy session. Special programs were also developed to encourage the twins to relate to other children, rather than exclusively with each other, and to comply in teacher directed activities. Another program was instituted to diminish "circle" perseveration; the twins consistently brought "round" toys for show-and-tell and cut circles from scraps of paper.

During their stay at the Communication Preschool, they made rapid growth in language structure through an imitation program, began initiating questions, and gained 10 months in vocabulary growth. There was close cooperation between the Experimental Education Unit and their regular school, and at the end of the year, the twins were enrolled in a junior first grade with individual speech therapy. They are now in regular education at grade level.

LUCINDA

Lucinda was born on January 15, 1965. She has a brother and sister, fraternal twins, who are fifteen months younger than she. Her father is a doctor; her mother attended graduate school, and is now a full-time housewife. Although there were no prenatal complications, Lucinda was born prematurely and weighed 5 pounds, four ounces; she was placed in an incubator at birth and was released from the hospital at 3 weeks of age. Immediately after her birth, her parents suspected that Lucinda might be delayed. At eight months, Lucinda began to have seizures and was placed on anti-convulsants. She was diagnosed as severely retarded at eleven months of age by a pediatric neurologist. The initial advice to the parents was to institutionalize immediately: "This child will be a total vegetable." The parents did not take that advice, and the mother stated that they have not left the house together since they brought Lucinda home from the hospital twelve years ago. Lucinda's health history shows multiple health problems: heart malfunction, long-lasting intestinal problems, seizures, and motoric problems. Her handicapping conditions include: mental retardation, communication and language deficits, and orthopedic handicaps. Lucinda received physical therapy at her local community's facility for special services to the handicapped from September, 1967 to June, 1969. She was placed at the Experimental Education Unit in January, 1970 and attended through August of 1970.

An intervention program was designed to help Lucinda develop skills necessary for enrollment in the school district's special education program. Target behaviors included "mouthing" inappropriate objects, leaving the classroom, expansion of receptive language and playskills, and fine and gross motor development. Lucinda responded to these programs and in August was judged ready for enrollment in her local district.

Since that time, she has attended special education programs and and has received individual speech and physical therapy on a continuing basis.

VERA

Vera was born on May 25, 1966, the youngest of three children. She lives with her mother and two brothers in a small city in Washington. Her prenatal and birth history were unremarkable, her health history shows frequent choking spells during the first months of life, due to a lax epiglottis, and recurring throat infections. Delayed speech development was first noted at 18 months, and Vera was referred by the family pediatrician to Seattle Hearing and Speech Clinic in September of 1968, where she received individual therapy for 18 months. She was also enrolled in a community preschool from September, 1968 to June, 1969.

Vera was evaluated at the Clinical Training Unit in June, 1970, and was diagnosed as having delayed language development in both the receptive and expressive areas. In the areas of gross and fine motor development, she functioned at age level; audiological evaluations showed her hearing to be within normal limits, and on non-verbal tests, her intellectual development proved to be within normal limits.

Subsequent to the diagnosis of her language deficits, Vera was enrolled in the Communication Preschool at the Experimental Education Unit. There, in September, 1970, in a structured classroom, an individual therapy program was developed to meet Vera's communication needs. This program included behavior management techniques and family involvement in the speech therapy and behavior management programs. The following September, Vera was enrolled in a diagnostic classroom in her local district and continued her attendance in the Communications Preschool. Her academic skills showed kindergarten readiness, but her communication skills, although improved, were still below age level. At the end of the school year, Vera had achieved many age-level skills and was recommended for a larger, academically oriented class at the 6 year old level.

Vera was enrolled in a learning language disabilities classroom in her local district in September of 1972, and a year later moved into a regular classroom. She is currently enrolled in a regular classroom, at grade level.

SHELLEY

Shelley was born prematurely on April 20, 1967, weighed under five pounds and was placed in an incubator. It was discovered that Shelley had congenitally displaced hips, which were surgically corrected. She was placed in a body cast and sent home after fourteen days. Shelley lived with her parents and older brother until she was ten months of age. At that time, a relative brought Shelley to her maternal grandparents; she weighed twelve pounds, was suffering from malnutrition, had no mobility skills, and a lack of muscle tone which barely enabled her to lift her head. The grandparents became Shelley's legal guardians and at fourteen months of age, Shelley was evaluated at Children's Orthopedic Hospital. She was diagnosed in June, 1968, as orthopedically handicapped and began receiving physical therapy at COH. The grandparents were instructed in exercise technique designed to increase Shelley's muscle tone and mobility. The therapist noted that the grandparents were deeply concerned about Shelley's development, very solicitious of her welfare, and despite the difficulties of age and transportation, tried to bring her to therapy as consistently as possible. Despite these efforts, Shelley developed severe scoliosis and had to wear a Milwaukee brace. She began to creep and sometimes cruise, using the furniture for support. She was developing language, but had few self-help skills, limited experiences and no contact with peers. The grandmother enrolled Shelley to the Experimental Education Unit for the development of gross motor, verbal, academic, and social skills. Shelley attended the Model Preschool from June, 1971 until August of 1973. During her enrollment, special programs and equipment were designed to help her develop gross motor skills, particularly walking, as well as the other skills needed for regular school placement. With teacher support, the use of a slant board and crutches, Shelley was able to achieve enough mobility to cruise about the classroom and engage in the daily activities. She played cooperatively with her peers and used language with great facility; her preacademic, pre-reading and writing skills improved each quarter. Shelley's motivation to walk grew as her mobility skills grew; it was reported that once during dramatic play, the other children invited her to sit with them, she responded by saying, "No, I'll stand. When I can walk like you, then I can sit." Soon, she was refusing her crutches and asking teachers and other children to hold her hand. She learned to climb on outdoor equipment in the fall of 1972, and she took 30 steps unassisted. By the summer of 1973, Shelley was able to use the toilet independently; her fine motor and preacademic skills were at the kindergarten level on the Comprehensive Preschool Development Profile; she had developed high social skills with her peers, but most importantly, Shelley was walking.

In September of 1973, Shelley was enrolled in the parochial school across the street from her grandparents' home, and Shelley walked to school. She is now in a regular education classroom at grade level.

TINA

Tina was born on May 24, 1969 on the Navajo reservation in Arizona. She now lives with her parents and four siblings in an urban area of Washington. Her prenatal and birth history were unremarkable, and Tina's early development was precocious: she rolled over at three months, sat at four months, and walked at nine months. But, at ten months, she contracted meningitis and spent six weeks in the hospital. Tina didn't walk again until she was two years old. She began to have seizures, petit and grand mal, which later were brought under control by medication, although she occasionally had minor attacks of eye-rolling and grand mal when ill. She became emotionally withdrawn from her family, rarely played with her siblings or toys, and had crying tantrums. The advice her parents were given at the time of Tina's illness was to institutionalize her immediately, as the illness would affect the child's learning. Tina's parents did not take this advice, instead they took her home and waited. At 2½ years, Tina spoke her first word, and at 4 years was using 2-3 word phrases. Because they were concerned about her delayed speech and behavior, her parents brought her to the Clinical Training Unit to be evaluated. Her socres on the Merrill Palmer indicated a mental age of 35 months, and an I.Q. score of 76; on the Sequenced Inventory of Language Development (SILD) she demonstrated receptive language at the 2½ year level and the 2 year level in expressive skills. Tina's speech was of varied intelligibility, and all examiners noted her behavior as withdrawn and/or disruptive. She was referred to the Experimental Education Unit and placed in the Model Preschool in July of 1973. Special programs were instituted to increase her language skills, and behavior readiness techniques were used to teach her appropriate classroom behaviors. She received individual speech therapy while enrolled. Her aggression towards teachers and other children decreased as her language skills improved. Tina made improvement in the areas of communication and social and self-help skills. In August of 1975, she was recommended for public school placement with continued speech therapy. Tina attended a regular public program for one year. The next year she was placed in a classroom for behavior disordered children, where she was also able to receive speech therapy.

CRYSTAL

Crystal was born on December 5, 1970, the second of two children. She lives with her parents and brother in the inner city of a large metropolis in Washington. Her father reports his occupation as professional and her mother is employed part-time in sales. When Crystal was eight months old, her parents first sought medical assistance for her seizures. She was diagnosed as epileptic and given anti-convulsant medication. At 24-months of age, Crystal was evaluated at the Child Development and Mental Retardation Center because of parental concern over her slow development. Her language function on the SICD showed receptive skills at 9-11 months, and expressive skills at 6-8 months. Her skills level was 10-months on the Bayley. At that time, the parents were advised that a program could be found to help Crystal develop skills, but no prediction could be made about her eventual intellectual development.

Crystal was enrolled in the Model Preschool Center at the Experimental Education Unit in February, 1974. Her daily classroom programs included toileting, and fine and gross motor programs. Behavior programs for "mouthing" inappropriate objects, and attending and receptive language intervention for "take" and "put" were established. In addition, she received occupational therapy for fine and gross motor development. There was also a parent involvement program for nutrition, and for increasing Crystal's vocalizations. In August of 1974, her teachers recommended that Crystal be placed in her local school district's Special Education program, where she is currently placed. She is presently in an ungraded primary classroom with no further diagnostic testing reported.

TODD

Todd was born on April 27, 1971. He lives with his mother, father, and older sister. His prenatal and birth history were normal; he spent one day in the hospital after his birth. His health history shows one episode of serious respiratory infection, recurring ear infections, allergies, and long-lasting intestinal problems. His mother is a nurse and sought dietary and allergy counselling.

At seventeen months of age, Todd was enrolled in a daycare program with 112 children and ten teachers. The teachers expressed concern about Todd's aggressive and hyperactive behaviors. He was subsequently identifed by a private physician as having a hearing impairment and behavior problems; his parents were also told that he had an above-normal intellect.

Todd was placed in the Integrated Preschool Classroom at the Experimental Education Unit in July of 1975. This classroom serves children who have a variety of mild handicapping conditions and normal "model" children. His classroom performance demonstrated his ability to acquire age-level skills in academic areas. Special techniques were employed to control his aggressive and non-cooperative social interaction, and he did show improvement in these areas. He remained in this classroom until August, 1976.

Todd was enrolled in a regular kindergarten program in September, 1976. Although he continued to need special behavior programs, he was promoted to the first grade.

GUY

Guy was born on September 3, 1964; his prenatal and birth history were unremarkable, and he was placed in his adoptive home shortly after his birth. He lives with his adopted parents and younger sister, who was also adopted in a large city in Washington. His medical history shows recurring ear infections, and one grad mal seizure; he has been on anti-convulsant medication and has had no other episodes. At age four, his tonsils were removed, and he received speech therapy at a community speech clinic for mouth-breathing and a slight tongue-thrust. He was enrolled in the Model Preschool and special programs were developed to increase his verbal initiations to adults and peers and to improve his social skills, particularly in large group activities, such as music. These programs proved successful, and the teachers recommended regular public school placement, with individual speech therapy.

In the fall of 1970, he was placed in a regular kindergarten and began receiving individual speech therapy. He is curently enrolled in a regular classroom at his age level and therapy was terminated in June of 1976.

TROY

Troy was born on October 26, 1965. He lives in the inner city of a large metropolitan area with his parents and older brother. His father is a full-time graduate student and his mother is a housewife and part-time student. Troy's birth and health history were normal, with the exception of recurring allergies and ear infections.

In March of 1969, Troy was enrolled in Headstart; three months later, the Headstart teacher and social worker recommended that he be evaluated at the Clinical Training Unit for possible hyperkinesis, behavior disorder, and learning problems. He was diagnosed as borderline mentally retarded and hyperkinetic; medication was recommended. The parents were advised that a special program could be found to help Troy develop skills, although no predictions about his intellectual development could be made.

In June, 1969, Troy was placed in the Model Preschool at the Experimental Education Unit. Special programs were designed to assist Troy in developing verbal, social, academic, and motor skills. Techniques were employed to diminish his aggressive behavior towards teachers and children in the classroom. He also received individual speech therapy for three days a week during his enrollment at the EEU.

Troy showed improvement in receptive and expressive language, and his articulation improved. His preacademic skills were soon at age-appropriate levels and his aggressive behaviors diminished. He developed a close friendship with one other child and a special program was instituted to expand his social interaction. In August of 1971, his teachers recommended that he be placed in his local school district's special education program. That September, he was enrolled in the district's neurologically-impaired classroom, which he is currently attending.

YOKO

Yoko was born on December 21, 1967 the youngest daughter of Japanese parents, she has three brothers and one sister. Her father has completed some graduate work and is employed full-time in a professional capacity; her mother has completed her bachelor's degree, but is now a full-time housewife. Although Yoko's prenatal history was unremarkable, she was born with a right hemiparesis and had her right heel cord cut shortly after her birth. She has learned to compensate well and her disability does not greatly interfere with her gross motor functioning. However, when she was three, her parents became concerned about her language and motor development. They enrolled her in a community preschool, where she attended for three months. As this experience was not successful for Yoko, her parents sought an evaluation at the Clinical Training Unit. It was noted during the evaluation that Yoko's performance was hampered by her refusal to try tasks that were difficult for her. She was referred for language delay to the Experimental Education Unit and in January, 1973 was enrolled in the Model Preschool. Further recommendations were made for family training on self-help skills and behavior management from the nursing department. It was also recommended that Yoko received occupational therapy. Yoko made rapid grains in these areas, once her non-compliant behavior diminished. The occupational therapy was terminated because her gross motor deficit was mild and the structured one-to-one therapy situation elicited much of her non-compliant behavior.

By August, 1974, Yoko had achieved age-appropriate skills in many areas and had gained in both receptive and expressive language skills. Her teachers recommended that she be placed in her school district's kindergarten program, which she attended from September, 1974 until June, 1975. In October of 1975, she was transferred to her district's learning center, which she still attends. She received physical therapy until June of 1976 and is still receiving speech therapy.

JARNAL

Jarnal was born on September 15, 1969, the oldest of three children. He lives with his mother and step-father in the inner city of a large metropolis in Washington. Both his parents are unemployed, and the family's sole source of income is welfare. His birth and medical history is unremarkable; at three years of age, he was referred by the family's social worker for evaluation because of parental concern over severe behavior problems and delayed language. He was evaluated by Clinic 1 at the CDMRC. Jarnal was found untestable on the Sequential Inventory of Communication Development because of behavior; clinical observation estimated his expressive language function at six to twelve months. Jarnal was placed in the Experimental Education Unit's Model Preschool for severe behavior problems. Intensive behavior intervention programs were established to control tantrums, running out of the room, and to encourage participation in daily classroom activities. He attended the Model Preschool until August, 1975. It was then recommended that he be placed in his school district's behavior disordered program. He is currently enrolled in this program.

DUGAN

Dugan was born on April 14, 1970, a middle child of six. His family lives in a suburban area of Washington. His father is employed full-time in a professional capacity, his mother is a full-time housewife. Dugan's prenatal and birth history were normal; he has a history of ear infections, and has had one grand mal seizure, related to an ear infection.

Dugan was diagnosed at the Clinical Training Unit in May, 1974, as being learning delayed and language delayed. His parents were advised that there was no way of knowing what his eventual intellectual development would be, and it was recommended that he be enrolled in the Experimental Education Unit's Model Preschool. He attended there from October, 1974 until June, 1975. Special behavior management programs were developed to increase his social interaction with peers, and to help him develop age-appropriate language and pre-academic skills.

In June, 1975, the teachers recommended a community preschool program for summer school and regular kindergarten placement, which he attended. In September 1976, he was placed in his district's learning disabilities program, where he remains today.

APPENDIX B

Program Description

Often, in evaluation studies, outcome data are reported on participating children with a minimal description of the nature of the program. Programs are often described with a general label (cognitive-developmental, behavioral, etc.) and a few descriptive phrases (structured, open, process-oriented, etc.) rather than a comprehensive framework for meaningful evaluation.

A number of authors have recently suggested that a thorough description of specific variables is essential in evaluating the adequacy of services provdied by an early intervention program. Messick and Barrows (1972) suggest going beyond a single assessment of the size of effects to investigate the purposes that produce the effects. Gordon (1972) and Parker and Day (1972) have provided useful guides for the conceptual analysis of early childhood programs.

Other authors have gone so far as to question the appropriateness of measuring outcomes as the basis for determining program effectiveness. Stodolsky (1975), in a review of the evaluation of open education, suggests that the quality of classroom experiences, children's work, and actual classroom behavior should form the basis of program evaluation. Zimiles (1977) summarizes the inadequacies of current evaluation designs and suggests that until we are better able to assess the impact of programs on children, "our primary method of evaluating early childhood programs should be to describe in great detail what they consist of and how they operate, and then hypothesize, on the basis of our theoretical framework, how a given program will affect children" (p. 69).

The purpose of this section is to describe the nature of preschool services provided to children involved in the present study.

The Model Preschool Center

The Model Preschool Center is part of the Experimental Education Unit (EEU) of the College of Education and the Child Development and Mental Retardation Center at the University of Washington. The center provides a number of programs for handicapped children ages 0-6, including infant learning programs, communication disorders programs, an integrated preschool, programs for Down's syndrome children, and preschool programs for the severely handicapped. Children are referred from a wide variety of community sources and placed in a program best suited for their age, developmental skills, and severity or type of handicap. Of particular interest for this study are the Communication Disorders Program; the Integrated Preschool, and the preschool programs for the severely handicapped.

The Integrated Preschool and the Preschool Programs for the Severely Handicapped

These preschool programs consist of three classrooms designed to serve young handicapped children ages 2½ to 6. They serve children with a wide range of academic, behavioral, and social disabilities.

Classroom distinctions. The three classrooms include: (a) Early Preschool Program-children with more severe disabilities; (b) Intermediate Preschool Program--less severe disabilities; high probabilty of behavior problems; and (c) Integrated Preschool--children with highest probability of placement in regular public school programs. The Integrated Preschool includes normal peer models.

Criteria in program entry/exit. Children accepted for classroom placement must meet the age restriction (3 to 5 years) of the program and have a demonstrated developmental handicap. Many have secondary handicaps. Children leave the program at age 6 or when skills are such that they can be placed in a community program.

General instructional approach. In general, the program operates on an overall developmental basis, with a high degree of structure, individualized assessment, behavioral specification of objectives, and individualized programming. Classroom decisions are data-based and program evaluation is based on observable behavioral changes.

Curriculum. Includes all areas of development with particular emphasis on social, communication, motor, and preacademic skill areas.

Daily schedule. Children attend these Preschool Programs for two hours per day, 5 days per week. The time in class is allocated approximately as follows:

SAMPLE DAILY SCHEDULE - PRESCHOOL PROGRAMS

Length of Time	Activity	Teacher Roles	Student Expectation
30 minutes	Preacademic and stories (small group and individual instruction)	1. Plan specific academic tasks based on individual objectives 2. Give directions 3. Demonstrate 4. Elicit responses 5. Insure appropriate behavior	1. Respond appropriately in a small group setting 2. Sit quietly 3. Attend to teacher 4. Work independently 5. Follow directions
60 minutes	Free choice	1. Plan and provide 3-4 activities for for children to choose 2. Help children select activities when necessary 3. Encourage peer interaction and appropriate use of materials	1. Choose an activity 2. Use materials appropriately 3. Interact appropriately with teachers and peers

Length of Time	Activity	Teacher Roles	Student Expectation
20 minutes	Group Activities (music, games, etc.)	1. Select activity 2. Focus on encouraging appropriate group behavior	1. Follow instructions in a group 2. Wait for turn
20 minutes	Large Motor	1. Insure safe use of equipment 2. Encouarge specific large motor skills based on individual objectives	1. Use equipment appropriately and safely 2. Select and become involved in an activity
10 minutes	Snack	1. Prepare snack 2. Supervise experience and encourage appropriate use of materials and interaction	1. Interact appropriately 2. Practice specific language skills

Average number of children. (a) Early Preschool--8; (b) Intermediate Preschool-15; (c) Integrated Preschool--18 (12 handicapped, 6 models).

Number of adults. Each class typically consists of one full-time teacher (master's degree), one half-time intern, and three student teachers.

Availability of one-to-one-instruction. This depends on the classroom. Most instruction in the Early Preschool class is one-to-one. In the other two classes, most instruction is in groups of 2 or 3 children, unless there is a specific need for an individual child.

Motivational systems. Primary reliance on systematic social reinforcement. Tokens and primary reinforcers are used on an individual basis as necessary.

Therapy. Occupational therapy, speech therapy, and physical therapy services are available for children who require them. Services are typically provided on a consultative basis to the teacher, except where a specific handicap requires individual therapy sessions.

Parent participation. Parent involvement is an integral part of the program's philosophy. Types of contacts include conferences to share information and have parents approve individual education programs, phone calls, home visits, group meetings, and training sessions for parents interested and willing to become more involved in their child's development.

Follow-up services. Placement services after leaving the preschool program include an analysis of currently available community programs and a recommendation of program placement to the parents. Once the child is placed in a program, school officials are informed that Preschool Program personnel are available for consultation to insure successful program placement.

Cost efficiency. Data indicate that almost one-third of these high risk children are being served in regular education classrooms and few are retained while in these classrooms. Consequently, dollar savings result from eliminating the expense of special education and eliminating the extra cost of educating a child twice in the same grade.

The Communication Program

The Communication Program consists of four classrooms serving children ages 2-6 with identified communication disorders (not related to hearing loss). The children come with a variety of known and unknown etiologies frequently accompanied by other developmental lags or associated handicaps.

Classroom distinctions. Children are assigned to one of four classrooms on the basis of general developmental level. Thus, each class has a heterogeneous population.

Criteria for program entry/exit. Children accepted for classroom placement must meet the age restrictions of the program and must have a communication or language disorder as a primary deficit. While children often exhibit a number of other secondary handicaps, the communication/language area must be the major handicapping conditions. Children leave the program at age six, or when language/communication skills are at the general level of other developmental skills.

General instructional approach. The program operates on a general developmental basis, with a high degree of structure, individualized assessment, behavioral specification of objectives, individualized programming, and particular focus on communication skills throughout the day. Classroom decisions are data-based and program evaluation is based on observable, behavioral gains.

Curriculum areas. While primary concerns deal with communication and language disorders, the program attempts to provide a rich overall preschool curriculum emphasizing social, communication, motor and pre-academic skill areas.

Daily schedule. Children attend the Communication Program two hours per day, five days per week. The time in class is allocated approximately as follows:

SAMPLE DAILY SCHEDULE - COMMUNICATION PROGRAMS

Length of Time	Activity	Teacher Roles	Student Expectation
30 minutes	Academic and/or language work groups	1. Plan lessons based on individual objectives 2. Give directions 3. Feedback	1. Complete work task 2. Work independently 3. Follow directions 4. Raise hand for questions or teacher check 5. Quiet while working 6. Do your own work
20 minutes	Large Group activites (story, music, show & tell)	1. Determine activity 2. Lead activity	1. Listen to information presented 2. Respond when asked 3. Sit on a mat
30-40 minutes	Free Choice	1. Select 3-4 activities for children to choose 2. Giving information 3. Redirection, listening 4. Insure a balance between working on communication skills and general developmental skills	1. Interact with teacher and peers 2. Select activity of choice 3. Use materials appropriately

Length of Time	Activity	Teacher Roles	Student Expectation
15 minutes	Snack	1. Plan and prepare 2. Initiate and support informal interaction	1. Practice language and other skills learned during the day 2. Practice self-help skills (throw away napkin, etc.) at individual level of development 3. Interact informally with peers
15 minutes	Motor	1. Plan a structured activity 2. Model activity 3. Insure safe use of materials	1. Participate in planned motor activity 2. Choose and use motor materials and activities appropriately

Number of children. Eight children in each of three classrooms, with of children ten in the pre-kindergarten program.

Number of adults. Each class typically consists of one full-time teacher, one part-time Communication Disorders Specialist (CDS), and two student teachers. In the classroom at any one time will usually be two adults interacting with the children and one taking data.

Availability of one-to-one instruction. Individual instruction is provided where necessary, but primary focus is on small group instruction to facilitate communication.

Motivational systems. Almost complete reliance on systematic social reinforcement. Tokens and primary reinforcers are used only as necessary on an individual basis.

Therapy. While most communication is group-oriented, individual speech therapy is also available as necessary. During a given quarter, an average of four children will be receiving individual speech therapy approximately three times per week, one-half hour each session. Physical therapy is also available, but in terms of teacher consultation and individual therapy. During a given quarter, an average of 1-2 children will be receiving individual physical therapy.

Parent participation. Parents are involved from the very beginning of the child's association with the Communication Program. Prior to class enrollment, parents visit the class and specify concerns they have about their child's development. These are then incorporated as primary objectives for classroom intervention. Parents are also invited to observe and meet with teachers regularly, and group meetings are held to meet specific parental needs. A systematic attempt is made to contact each parent at least twice a quarter.

Follow-up services. During the year prior to public school placement, the CDS begins to contact the public schools. Services include alerting the school about future enrollment, suggesting possible placement, and an invitation for the director of special education to observe the LEU program. Classroom personnel are also available for consultation once the child is enrolled in the public schools.

Cost efficiency. Data indicate that almost one-third of these high risk children are being served in regular education classrooms and few are retained while in these classrooms. Consequently, dollar savings result from eliminating the expense of special education and eliminating the extra cost of educating a child twice in the same grade.

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APPENDIX C

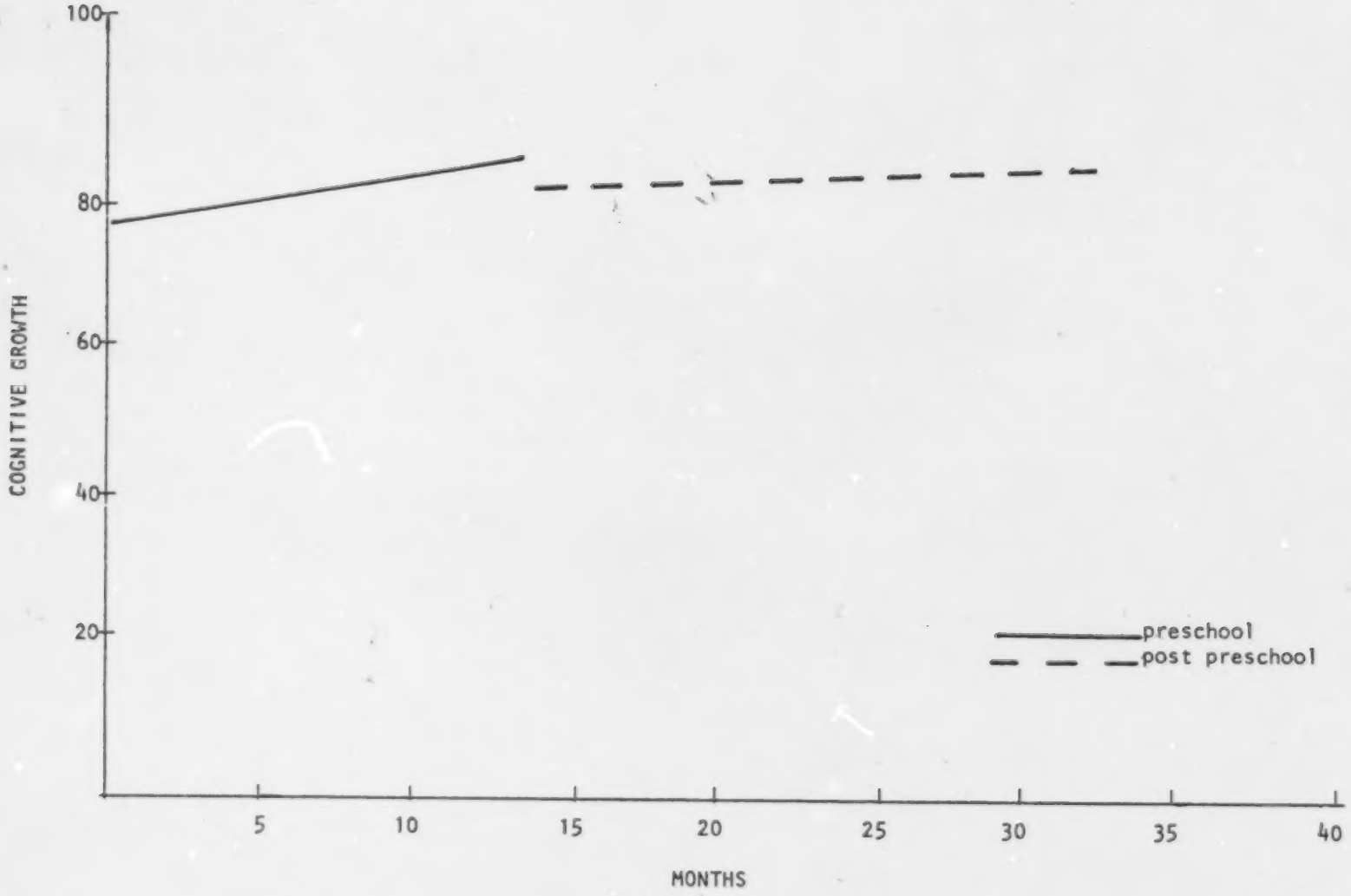

Figure 1. Cognitive growth scores in preschool and post preschool settings

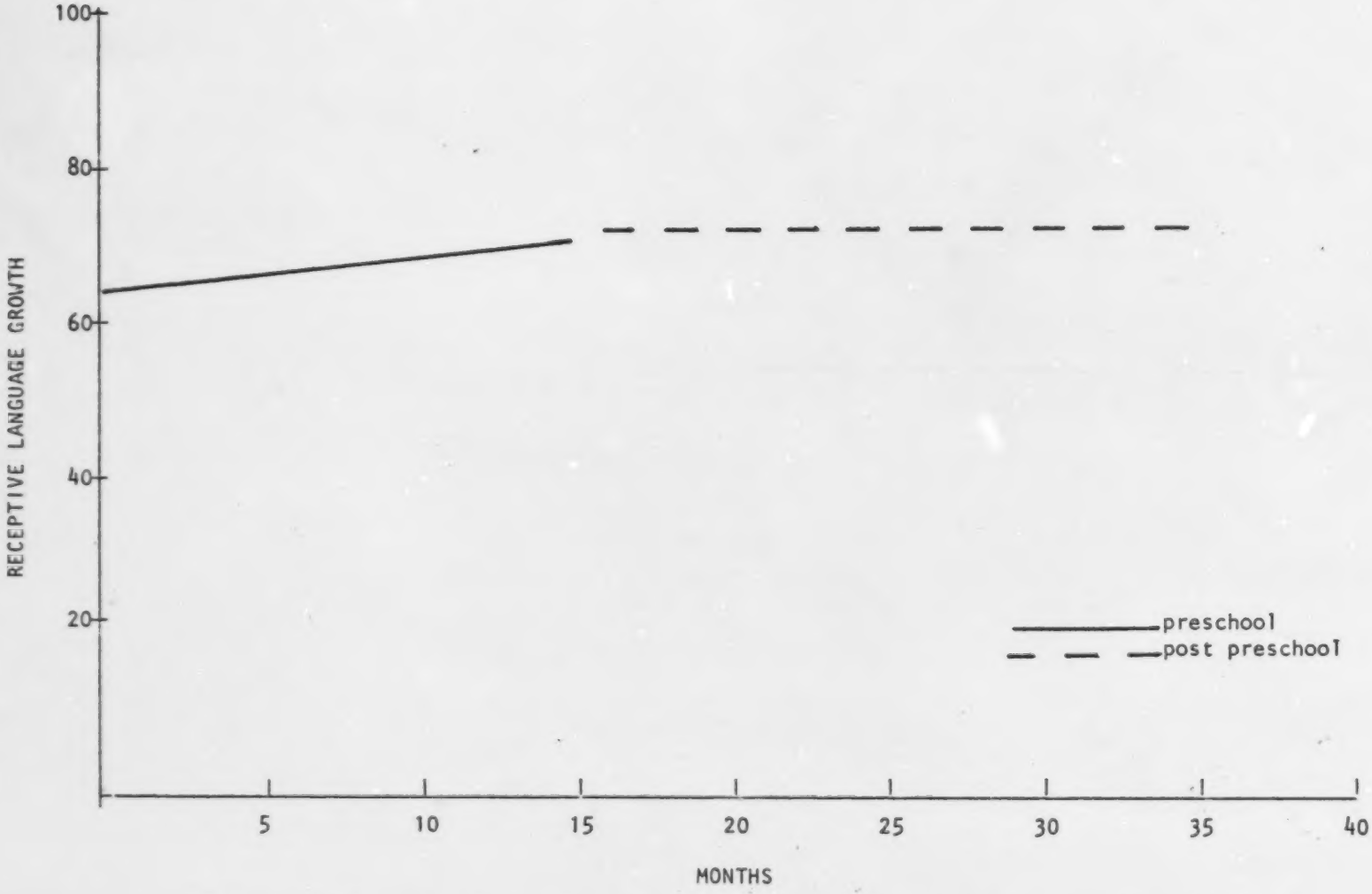

Figure 2. Receptive language growth scores in preschool and post preschool settings